BULLETIN OF THE

TAYLOR SOCIETY

AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE
AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

The Illusion of Final Authority
Mary P. Follett

The Practical Man in the Making
Meyer Bloomfield

Management and Research
H. S. Person, Mary Van Kleeck, R. L. Tweedy

Engineering Societies Building
29 W. Thirty-Ninth St.
New York

DECEMBER, 1926 VOL. XI, NO. 5

Objects of the Taylor Society Incorporated

The objects of this Society are, through research, discussion, publication and other appropriate means:

1. To secure—for the common benefit of the community, the worker, the manager and the employer—understanding and intelligent direction of the principles of administration and management which govern organized effort for accomplishing industrial and other social purposes.

2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.

3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaptation and application under varying and changing conditions.

4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, the worker, the manager and the employer.

5. To inspire in labor, manager and employer a constant adherence to the highest ethical conception of their individual and collective responsibility.

Membership

The membership of the Society comprises Members, Junior Members, Honorary Members, Life Members, Firm Members, Contributing Members and Student Associates. Application for membership should be made on a regular form which may be secured from the Society. New members may be elected directly to the grades marked*.

1. **Member*: An individual interested in the development of the science and the art of management as engineer, executive, operative, scientist, investigator or teacher. Minimum age 28. Initiation Fee, $15. Annual dues including subscription to the Bulletin, $20.
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3. *Honorary Member*: A Fellow, over 50 years of age, who has rendered exceptionally distinguished service in the advancement of the science and the art of management.
4. **Life Member*: Any Fellow or Member who has prepaid all dues by the payment of $500.
5. **Firm Member*: A firm or organization interested in the advancement of the science and the art of management which desires to make the service of the Society available to members of its organization. A firm member designates two representatives (who may be changed from time to time at the organization's discretion) who have all the rights and privileges of membership except the right to vote and to hold office. Annual dues, including two subscriptions to the Bulletin, $40.
6. **Contributing Member*: Any individual, firm or organization desiring to promote the work of the Society by an annual contribution of $100 or more. A contributing member has all the privileges of personal or firm membership, as the case may be, including one subscription to the Bulletin for each $20 contributed.
7. **Student Associate*: A regularly enrolled student of management in any school of engineering, business administration, commerce or arts, of collegiate rank, or a graduate of such institution who has applied for membership not later than one year after graduation, elected upon recommendation of the instructor in charge of management courses. A Student Associate may become a Junior Member, without payment of initiation fee, any time after graduation and must become a Junior Member at the age of 25. Annual dues including subscription to the Bulletin, $3.

All dues are payable in advance, either annually or in semi-annual installments. The fiscal year is November 1 to October 31. Members elected other than at the beginning of the fiscal year are charged pro rata (quarterly) for the first year.

FEB-3'27 ©CLB 732970

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TAYLOR SOCIETY
AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE AND THE ART OF ADMINISTRATION AND OF MANAGEMENT
Published by the Taylor Society Incorporated, at
Engineering Societies Building
29 West Thirty-Ninth St.
New York

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Published every other month. Per year to Members $2.50; to others $3.00. This issue $.75.
Entered as second-class matter, Dec. 17, 1921, at the Post Office at New York N. Y., under the Act of March 3, 1879.

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Bulletins Wanted

We have available only a few copies of the February and none of the June-August, 1926, issues of the Bulletin. Both numbers are much in demand and both are of such importance as to warrant every effort on our part to fill library orders. Calls continue also for the October, 1925, and December, 1924, issues, both of which have been out of print for some time. Readers who do not bind their issues may render a real service to libraries and to the Society by returning copies of any of these issues.

Notice to Binders

This issue, although identified as No. 5, completes Vol. XI. The numbers making up the issue are: 1, 2, 3 and 4, 4, 5.

Comment

THE December Meeting of the Taylor Society was attended by some three hundred registered, regular participants, and by about two hundred additional people who came to particular sessions. In intellectual and inspirational quality the papers and discussions maintained the highest standards. They will be appreciated by those who read them as they were by those who were privileged to hear them—the attention and discussion at every session continued without lag until the presiding officer was compelled to declare adjournment in order to preserve the regularity of the program.

IT IS interesting to note in what phases of management executives are now interested, practical line executives, such as general managers and production managers. The time was—when we were on a sellers' market—that they were interested only in the more obvious production problems. Then came the time—when we first experienced a buyers' market—when even production managers became interested in the sales problem, for they were beginning to feel and understand the distinct hindrance to good production methods caused by inefficient selling. Then as the buyers' market continued and brought into focus a variety of influences which condition production activities, they became interested in many problems formerly not perceived to be pertinent to production. The December meeting afforded opportunity to hear papers on production, marketing, research, the economics of overhead costs and the theory of executive authority and responsibility; and not a few general managers and production managers have since the meeting commented with enthusiasm on such papers as those on research and executive authority.

THE paper by Miss Follett will challenge the imagination and intellect of every practical executive. It is a misfortune that the article in cold print cannot reproduce the atmosphere of the session at which it was presented; the interested, concentrated, tense attention with which it was received. A general manager and a production manager of a northern New York plant remarked to us after the adjournment of the session: "That was one of the most interesting papers we have ever heard; it put into words what we have been thinking about and trying to talk about." The reason practical executives responded in such a manner is that Miss Follett's

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study is a study of behavior, of actual executive behavior, and they are living every day in the midst of such behavior. The essence of the behavior is that the assumption of final executive *technical* authority based on rank is an illusion; that such authority resides where the knowledge and the competent judgments are. We have underlined the word *technical* to distinguish the authority in Miss Follett's mind from legal or paper final authority.

OF THE papers presented at the December meeting those selected for publication in this issue were selected chiefly because they were most ready for the printer. The other papers will appear in the next issue. Mr. Bloomfield's address was presented at the meeting of teachers of management held under the auspices of the Taylor Society in conjunction with the meetings of the Taylor Society and of the Management Division of the American Society of Mechanical Engineers. Its argument that the completely practical man is a man of scientific imagination and theories makes the address a logical introduction to the paper concerned with research. Mr. Person's paper is a layman's survey of research and research methods from the point of view of industry's interest, and a suggestion that industry should become more concerned with research. Miss Van Kleeck's paper is an argument for perfection of the interview as an essential method of investigation of some of the most vital problems of industry. Mr. Tweedy's paper describes a pioneer organization of manufacturers for joint research similar to well known organizations which are performing that function for merchandising.

Annual Business Meeting

THE annual business meeting of the Taylor Society Incorporated was held at 4 P. M., December 9, 1926, in Room 611, Engineering Societies Building, 29 W. Thirty-ninth Street, New York, N.Y.

The meeting was called to order by Percy S. Brown, president, the presence of a quorum determined, and the notice of the meeting read.

The Managing Director thereupon made a brief report concerning the incorporation of the Taylor Society, a voluntary association, as The Taylor Society Incorporated. Incorporation of The Taylor Society Incorporated had been authorized by the members of the Taylor Society at a special meeting held April 26, 1926, and articles of incorporatoin had been filed in the office of the Secretary of State of the State of New York on July 13, 1926.

The meeting then proceeded to adopt By-laws of The Taylor Society Incorporated. The By-laws adopted are essentially the same as the Constitution of the former Taylor Society, unincorporated. The By-laws are being printed and will be sent to each member.

The meeting then proceeded to elect officers in accordance with the By-laws which had been adopted. The balloting resulted as follows:

President and Director, to serve one year.	Morris L. Cooke
Vice-President and Director, to serve two years.	C. L. Barnum
*Vice-President and Director, to serve one year.	Howard Coonley
Treasurer and Director, to serve on year.	Edward Clark, 3d.
Director, to serve two years.	A. B. Rich
Director, to serve two years.	N. G. Burleigh
Director, to serve two years.	Harlow S. Person
*Director, to serve one year.	Lillian M. Gilbreth
*Director, to serve one year.	H. K. Hathaway

(The officers identified by an asterisk were formally elected by The Taylor Society Incorporated, to complete the two year terms for which they had been elected by The Taylor Society, unincorporated, at the annual meeting held December 4, 1925.)

The reports of the Treasurer, the Finance Planning Committee and the Committee on Honorary Members and Fellows were then received, accepted and placed on file. The report of the Treasurer will be printed and sent to members.

A Nominating Committee was then elected as follows: John Williams (New York—Chairman), Mary Van Kleeck (New York), Robert Anderson (Auburn, N. Y.), A. L. Kress (Williamsport, Pa.), Philip F. Moen (Providence).

The Illusion of Final Authority[1]

Authority Must Be Functional and Functional Authority Carries with It Functional Responsibility

By MARY P. FOLLETT

Author of "Creative Experience"

When writers on business management speak of "ultimate authority," and "supreme control" as two of the functions of administration, I think that expressions are being used which are a survival of former days. These expressions do not seem to me to describe business as conducted today in many plants. Business practice has gone ahead of business theory. So much goes to contribute to executive decisions before the part which the executive head takes in them, which is indeed sometimes merely the official promulgation of a decision, that the conception of final authority is losing its force in the present organization of business. This is as true of other executives as of the head. Here, too, final decisions have the form and the force which they have accumulated. I have seen an executive feel a little self-important over a decision he had made, when that decision had really come to him ready made. An executive decision is a moment in a process. The *growth* of a decision, the *accumulation* of authority, not the final step, is what we need most to study.

The most fundamental idea in business today, that which is permeating our whole thinking on business organization, is that of function. Every man performs a function or part of a function. Research and scientific study determine function in scientifically managed plants. I think a man should have just as much, no more and no less, authority as goes with his function or his task. People talk about the *limit of authority* when it would be better to speak of the *definition of task.*

If, then, authority is derived from function, it has little to do with hierarchy of position as such, and in scientifically managed shops this is more and more recognized. We find authority with the head of a department, with an expert, with the driver of a truck as he decides on the order of deliveries. The despatch clerk has more authority in despatching work than the president. I know a man in a factory who is superintendent of a department which includes a number of subdepartments. He tells me that in many cases he says to the head of a sub-department, that is, to a man in a subordinate position to his, "With your permission, I do so and so." This is a decided reversal of the usual method, is it not? In the old hierarchy of position the head of the subdepartment would be "under" the superintendent of the department; the "lower" would take orders from the "higher." But my friend recognizes that authority should go with knowledge and experience, that that is where obedience is due, no matter whether it is up the line or down the line. Where knowledge and experience are located, there, he says, you have the key man of the situation. If this has begun to be recognized in business practice, we have here the forerunner of some pretty drastic changes in our thinking on business management.

A moment ago I used the word "under." Perhaps it may seem advisable sometime to get rid of the words "over" and "under." I know a chief executive who says he does not know whether he is at the head or at the bottom, and he wishes there was some way of making out a chart that did not put the president at the top. I was interested last summer in England, in meeting the head of a large business, to find that one of the chief difficulties in his thinking was concerned with this question. He said he didn't like all this matter of some being "over" others, yet he knew it was necessary—as we all do. What is the way out of this dilemma?

Two years ago my nurse in the hospital said to me, "Did you notice that operating nurse? Didn't she look black? I wonder what has happened this morning"? I innocently said, "Perhaps one of the surgeons has reprimanded her for something." To which my nurse replied, "Why, he couldn't. The doctors are not *over* us. They have their work and we have ours." At first I did not like this, it seemed like chaos indeed. I thought the old way much better—of the doctor's having full responsibility, of his giving all the orders and seeing to it that the nurses obeyed his orders. But I asked several doctors about it, and they told me that there is a marked tendency now in this direction, and while it obviously has drawbacks, there may be a good side to it; it may indicate on the part of the nurses a greater interest in their work and a willingness to take more responsibility.

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[1] Paper presented at a meeting of the Taylor Society, New York, December 10, 1926.

It seems to me that the word "over" represents something perfectly proper and something not proper. The thing it should not mean I can best illustrate by the wife who said with pride: "John has seventy in his department that he's boss over." But there is much that is hastening the disappearance of the word used in this way, notably newer methods of dismissal. Dismissals made after consultation with the psychologist may come in time to be looked on in the same way as when a doctor says a man's heart is too weak for a particular job. That decision does not mean that the doctor is "over" anyone. It is only capricious firing, firing that is unfounded, that makes a man over another, and that kind of firing is disappearing.

The conception of authority that we are considering this afternoon, the conception of authority as belonging to function, should do away with the idea widely held that the president *"delegates"* authority. A writer on this subject says: "The chief executive should define clearly each staff executive's responsibility and its relation to general purposes and plans and should grant each staff executive adequate corresponding authority." But is that exactly what happens in business? Is not this as a matter of fact decided by the plan of organization? The duties, authority and responsibility of the staff executives are inherent in the plan of organization. Whatever formality is necessary on the part of the president *is* more or less of a formality.

This phrase "delegated authority" assumes that your chief executive has the "right" to all the authority, but that it is useful to delegate some of it. I do not think that a president should have any more authority than goes with *his* function. Therefore, I do not see how you can delegate authority except when you are ill or taking a holiday. And then you are not exactly delegating *authority*. Someone is doing your job and he has the authority which goes with that particular piece of work. Authority belongs to the job and stays with the job.

The view that the *"right"* to all authority lies with the head, but that he delegates some of it to others comes, I think, from what one might call the historical outlook on leadership rather than the analytical. We look back and see that when a business begins in a small way the head has many duties which after a while, as the business grows, are given to others. This has made people think that these duties by right belonged to the head, but that he has found it convenient to delegate some of them while, as a matter of fact, the convenience is just the other way round. There are in business certain separate functions; the smallness of a business may make it convenient for one man to perform them all, but they are stll separate functions. For instance, in a small bank, the head, in addition to his many other duties, looks after new business. In a large bank, a separate man has the responsibility for new business, exchange, deposits, credit loans, etc. But the *separation of function does not mean the delegation of authority*. The unfortunate thing in writing on business organization is that our language has not caught up with our actual practice. As distribution of function has superseded hierarchy of position in many plants, delegation of authority should be an obsolete expression, yet we hear it every day.

I say that authority should go with function, but as the essence of organization is the interweaving of functions, authority we now see as a matter of interweaving. An order, a command, is a step in a process, a moment in the movement of interweaving experience, and we should guard against thinking this step a larger part of the whole process than it really is. There is all that leads to the order, all that comes afterwards—methods of administration, the watching and recording of results, what flows out of it to make further orders. If we trace all that leads to a command, what persons are connected with it, and in what way, we find that more than one man's experience has gone to the making of that moment—unless it is a matter of purely arbitrary authority. Arbitrary authority is authority not related to all the experience concerned, but to that of one man alone, or one group of men.

The particular person identified then with the moment of command—foreman, upper executive or whoever it may be—is not the most important matter for our consideration, although of course a very important part of the process. All that I want to emphasize is that there *is* a process. A political scientist writes, "Authority coordinates the experience of man," but I think this is a wrong view of authority. The form of organization should be such as to allow or induce the continuous coordination of the experience of men. Legitimate authority flows from coordination, not coordination from authority.

Another corollary from this conception of authority as a moment in interweaving experience is that we have not authority as a mere left-over. We cannot take the authority which we won yesterday and apply it today. That is, we could not if we were able to embody the conception we are now considering in a plan of organization. In the ideal organization authority is always *fresh,* always being distilled anew. The importance of this in business management has not yet been estimated.

Of course, you will understand that in all this I am speaking of business organization in the more progressive plants, but they are as yet far more organized under the old doctrines.

Let us now ask ourselves what there is in the present organization of business which seeks to diffuse rather than to concentrate responsibility. First, management is becoming more and more specialized; the policies and methods of a department rest on that department's special body of knowledge, and there is a tendency for the responsibility to be borne by those with that special body of knowledge rather than by a man at the top because of his official position.

I saw the statement recently that the administrative head should hold frequent consultation with the heads of departments, and from the facts thus gained make his final decisions, construct his policies. But it is a matter of everyday knowledge to business men that their heads of departments pass up to them much more than mere facts. They give interpretation of facts, conclusions therefrom, judgments, too, so that they contribute very largely to final determination, supreme control, even to what has been called administrative leadership. In fact, both as to the information and the conclusions handed up from the executives, it is often not possible for the head to take them or leave them. These conclusions and judgments are already, to a certain extent, woven into the pattern, and in such a way that it would be difficult to get them wholely out. Hence, while the board of directors may be theoretically the governing body, practically, as our large businesses are now organized, before their decisions are made there has already taken place much of that process of which these decisions are but the last step.

Another indication of the view of authority which I am considering this afternoon, is that the planning department provided in so many plants is passing from a *tool* of management to a *part* of management, a part of a functionalized management. To be sure, the planning department is still so much of a novelty that there are many different ideas in regard to its place in the plant. It may be asked for only statistical information. In the case of a decision pending for the sales department, for instance, it may be asked for a record of past sales with analysis in regard to volume, localities, etc. Usually, however, it is asked for more than this, for the probable future development of certain localities, what the future demand will probably be, the probable effect of the raising of price. By the time this has all been passed up to the head his decision is already largely predetermined.

Whatever our exact idea of a planning department, I think we shall agree that functional management means that authority goes with function and not with a certain position at the top of the chart. There is hardly a staff official, is there, who provides merely material on which some line official bases his decision? Take the industrial relations manager. He is usually given a staff position. His work is largely research and planning, but in the presentation of results there is advice, either given openly as advice or suggestion, or else veiled under his general conclusions. If this official does not issue orders, does not exercise authority in the usual sense, he has as real an influence as the line official who issues orders and who influences his subordinates by direct contact with them.

Still another evidence of the diffusion of authority is the tendency in present business practice to solve problems where they arise, to make reconciliations at the point where conflict occurs, instead of the matter being carried "up" to someone. This means that departmental heads are being given more and more authority within their own units. Of course, all methods of decentralization tend to weaken the significance of "final" authority, and the tendency today is to decentralize. The administrative head is not the man in whom all control is centered, but the leader of many men with specific control.

I say that the tendency is to decentralize. I have heard it said twice at this conference that the tendency is to centralize. Both statements are true, for centralization and decentralization are parts of exactly the same thing.

Instead then of supreme control, ultimate authority, we might perhaps think of cumulative control, cumulative authority. I am indebted to Mr. Dennison for this phrase which seems to me to have implicated in it one of the most fundamental truths of organization.

Mr. Filene says: "I think some day we are going to recognize that this idea of one leader in a business is a fallacy, and that a composite general manager will develop." What the Filenes, and other firms too, have done is to make their formal organization coincide with a decided tendency in business practice. They found that there was power, leadership, all along the line. They recognized the existing. They sought to take advantage of it, to make this scattered power cumulative and hence more effective. There is nothing academic about the recent reorganization of business plants. There is nothing self sacrificing either. The upper executives have not given up anything. They have gathered into the management of their business every scrap of useful material they could find.

That business men are facing this undoubted fact of pluralistic authority, that modern business organization is based to some extent on this conception, is very interesting to me, for I have been for many years a student of political science, and it seems significant to me that now I have to go to business for the greatest light on authority, control, sovereignty—those concepts which have been supposed to be peculiarly the concepts of political science. For instance, in the last book I read on government, a recent one, the writer speaks of a "single, ultimate centre of control," but I do not find that practical men are much interested in ultimates. I think that with political scientists this interest is a survival from their studies in sovereignty. The business man is more concerned with the *sources* than with the *organs* of authority. Moreover any *over* emphasis on ultimate control disregards one of the most important trends in the recent development of thinking on organization: "central control" used to mean the chief executive; now it is a technical expression of scientific management indicating the points where knowledge and experience on the matter in question are brought to a focus. This is very significant.

I should like, however, over against the statements made by students of government, to give some words of a practical administrator. In Franklin Lane's report to President Wilson on leaving the Cabinet, in suggesting that the heads of departments should be the advisors, the constructors of policies, he said: "In a word, we need more opportunity for planning, engineering, statesmanship above, and more fixed authority and responsibility below." This is interesting as taking away some of the pomp and circumstance which one attached to the word authority and making it a part of routine detail. Indeed authority seems to be becoming a humbler virtue.

And as it is the idea of pluralistic authority which is dominating progressive business organization today, so the crux of business organization is how to join these various authorities. Take the purchasing of materials. The authority for this should be assumed by the purchasing agent and by the department which gives its specifications to the purchasing agent. If the purchasing agent thinks that some of these specifications could be changed and cost thereby reduced without decreasing quality, he should discuss this with the department in question. While I realize that much can be accomplished by friendly relations between individuals, I think that organization should have for one of its chief aims to provide for a joint authority in those cases where combined knowledge is necessary for the best judgment.

This problem is being solved in a number of plants by a system of cross functioning. In one factory I know, they are trying to build up a structure of inter-locking committees. This is perhaps the most important trend in business organization. I don't mean committee government when I say that—that may or may not be the best way of meeting this problem—but the trend toward some kind of cross functioning. Let me take the New England Telephone Company as providing an example of this trend, although of course there are many other companies which would do equally well for illustration. Here we find the four departments—traffic, engineering, commercial and plant—conferring with one another or all together. These conferences are often informal but are expected of all officials. Each department is supposed to get in touch with certain others. The district traffic manager asks the wire chief from the plant department to talk the matter over with him, or if it is a commercial matter, he calls in the commercial manager of that district, or if it is a question of blue prints or costs, he asks the engineering department if they will send a man over. They may settle it among themselves. If not, the traffic manager puts it up to the division of traffic, and he may consult the division superintendent of plant and commercial departments. Here, you see, we have a combination of going both across and up the line. When the Main exchange in Boston was cut into two last summer, the question came up whether to cut thirty five a day or five hundred in a blanket order over night. This affected all four departments—traffic, engineering, commercial and plant. They agreed, after discussion, on the blanket order. If they had disagreed, they would have taken it up to the general superintendent of each department —*up* the line, note. Then the four superintendents would have consulted—here a cross relation. If these had agreed the matter would have ended there. If not, it would have had to go to the General Manager—*up* the line.

This combination of across and up exists, as I have said, in many plants today, and I have found it an interesting thing to watch, interesting because significant perhaps of a change in the accepted principles of organization which will eventually change not only business, but government as well. And it is noteworthy, in connection with this point, that the Telephone Company does not have, and does not seem to need, any special coordinating department, because there is a "natural" continuous coordinating inherent in their form of organization.

The chief weakness in business organization is lack of coordination. Yet I hear more talk of coordination than of anything else. Why then do we not get it? One reason is that the system of organization in a plant is often so hierarchical, so ascending and descending, that it is almost impossible to provide for cross relations. The notion of horizontal authority has not yet taken the place of vertical authority. We cannot, however, succeed in modern business by always running up and down a ladder of authority. Moreover, cross functioning seems often to be conceived of as useful only when difficulties arise, or when it is obvious that joint consultation on some specific problem would be desirable. But as such consultation is necessary all the time, some machinery which will operate continuously should be provided. And this is now recognized.

Of course, one difficulty about a degree or a manner of working together which hides individual effort comes from the egotism, the perfectly natural and to some extent justifiable egotism, of the persons concerned. Each executive wants his special contribution to get to the ears of the boss.

Another difficulty about coordination, and one of the greatest, is that it is not sufficiently recognized that coordination is not a culminating process. You cannot always bring together the *results* of departmental activities and expect to coordinate them. You must have an organization which will permit interweaving all along the line. Strand should weave with strand, and then we shall not have the clumsy task of trying to patch together finished webs.

The chief reason, however, that we are not more successful with this problem is that we do not yet fully comprehend, I think, the essential nature of coordination. Coordinated control, or what I have called the field of control as distinct from any one factor in it, is more than a mere addition of specific controls. I should like to spend the few moments I have left in considering this point further.

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In any situation the control is complex, not single. Consider Italy at the present moment. While the most interesting thing about that situation is that one man is such a large factor in it, yet to understand the Italian situation we have to get together *all* that is influencing Italy, all that has gone to give Mussolini his power. In the same way, in attempting to solve a business problem it is essential first of all to find out what are all the factors which constitute that problem. And yet that is not enough, to get together all the factors; we have not found what I call the field of control by saying that it is composed of A plus B plus C plus D. The field of control is determined not only by these constituents but by their relations to one another. This means, among other things, that if one factor is withdrawn or added to a situation, you have then not that situation minus or plus that factor, for all the rest will be changed. You see it on a Board of Directors. One man leaves and all the rest become a little different. The influence of that Board of Directors as a total is not the same as it was minus that man's influence, because his withdrawal, by changing slightly every other man, has made the total a little different. You all know that a President in relation to one Board of Directors may be very different from that same President in relation to another Board.

An organization consultant called in to find why a certain department in a business was not keeping pace with the rest of the business, told me he found that the solution of the problem lay not in changing any one thing or any two or three things in that department, although that was what the Board of Directors had expected him to do. But what he suggested to the Board was certain changes in the relation between the factors of which that department was composed. In the language I am now using he found that the important thing in that particular field of control was not some one or another or all of the constituents, but the relation of these to one another.

All that I am saying is a matter of everyday experience to the business men. It happens to be considered by certain scientists the most important thing in present scientific thinking. The most interesting thing in the world to me today is the approachment I see between progressive business thinking, as well as various tendencies in business practice, and certain recent developments in the thnking of scientists, philosophers and psychologists. Men working quite independently of each other, working in quite different fields, too, are coming to agree on a very fundamental principle, perhaps the most fundamental principle the human mind has yet caught sight of. This principle is involved in the very nature of unities. It is that the essential nature of a unity is discovered not alone by a study of its separate elements but also by observing how these elements interact. Such biologists as Henderson and J. S. Haldane (Henderson is a biological chemist), such philosophers as Whitehead, such physiologists as Cannon, such psychologists as the whole *Gestalt* school, are coming to agree on this point. They say that every organization has a form, a structure, and that what that organism does, its unified activity, depends not on the constituents alone, but on how these constituents are related to one another.

As I am saying the same thing of a total of control; namely, that a field of control is not a mere aggregation of specific controls, it was not quite accurate, or rather did not tell the whole story, when I spoke of cumulative authority, unless you understand cumulative authority as integrated authority, as interweaving controls, an expression I also used. Biologists speak of the "system of control" in an organism meaning exactly this, the self-direction, self-regulation, which an organism has in virtue of the way its parts behave together. This parallel in thinking between academic men and business men is enormously significant. If I were speaking modestly, I should say that I think we may be pretty sure we are on the rght track if we find such confirmation as this from scientists and philosophers. If I were speaking not modestly but as I really believe, I should add to that, that I think they also might feel that they are on the right track because we in these associations studying business management can from our experience confirm what they are saying.

The possible examples from business management of the working of this fundamental principle are innumerable. Take a situation made by credit conditions, customers' demand, output facilities, and workers' attitude. They all together make a certain situation, but they constitute that situaton through their relation to one another. If you change one, usually some, if not all, of the others are changed.

Or take the way sales policy, production policy and financial policy influence one another. When they join to form a genuine unity, we have no mere aggregation. Each has been somewhat changed in the process of joining. And the whole, or general policy, is different because of this change in the parts. That is, it is not the aggregation but the integration of these parts which constitutes the field of control. This is the point we forget, and forget to our disaster, over and over again in business management. The awareness of what the field of control actually is in a given situation is essential to successful business management. Perhaps that is what hunch is—recognizing the field of control, but we cannot consider hunch this afternoon. All that I want to emphasize is that whether we do it unconsciously, as in hunch perhaps, or consciously and deliberately, the first approach to every business problem should be the question, "What is the field of control?" and the realization that that field of control is constituted not by certain elements alone, but by certain reciprocal activities.

I should like to say incidentally that if democracy means only all taking part, I do not believe in democracy. It is organization we want, the relating of parts, cofunctioning organic interactivities. The great weakness of the English Labor Party is, in my opinion, that it does not see this.

If the first step in the understanding of a business problem is an understanding of what constitutes the field of control, the second is an understanding of the process of passing from one field of control to another. Perhaps no one thing will have a greater effect on business management than a realization of the importance of this, for then anticipation will not mean forecasting alone; it will mean far more than predicting the next situation. It will mean more than *meeting* the next situation, it will mean *making* the next situation. One of the largest manufacturers in Milan said last July that he and a number of other Italian manufacturers were making a thorough study of American methods of scientific management so that they would be ready to deal with the industrial situation when Mussolini's hand should be withdrawn. This means in the language we are using this afternoon that when that field of control is broken up, they are going to have a hand in making the next. This kind of anticipation goes far beyond forecasting, but the consideration of anticipation not as prediction but as control would take us beyond the limits of this paper. I have given this hint here because back of everything I ever say or write on business management there is always the idea of control as the self directing power of a unity. A genuine coordination or integration gives you control. That is why coordination is the most important point in organization.

A few weeks ago I was having a talk with a small group of people. Two of the men were philosophers, one was a consulting expert on industrial relations. The question was asked by some one why business men were doing so much thinking nowadays, thinking on abstract questions. My answer to that was that all of us, including business men, are accepting more fully perhaps than ever before in the world, the idea that we can control our activities. In our individual lives the tendency is no longer to submit to fate, inheritance or even environment. We see this same trend of thinking in the social sciences. Roscoe Pound, a jurist, writes of conscious control. John Maynard Keynes, an economist, says that we are now entering on an era of stabilization in which the doctrine of laissez faire must be abandoned in favor of deliberate *conscious control.* In business, too, it is the dominant thought. Why are we studying the business cycle? Why are we now studying unemployment instead of accepting it as inevitable? What is all the study of management but just an indication of this? Moreover, the real reason that we have personnel work, the study of human relations in industry, is because we have waked up to the fact that the human as well as the mechanical side of industry can be studied, and much learned thereby to give us control of the situations between executives and workers or between executives themselves.

In short, business is coming to be considered not so much a speculative undertaking as a social enterprise, resting on scientific knowledge, controllable by further and further developments in scientific methods. The dominant thought of the twentieth century, the contribution which the twentieth century is giving the world, is a richer

idea of the meaning of control than we have ever had before, and it is among business men that we find those who are doing perhaps more than anyone else to give that thought reality.

Discussion

G. G. Barber.[2] I have read Miss Follett's article entitled "The Illusion of Final Authority" several times. I have found an increasing interest and widening meaning with each rereading.

Miss Follett's writings on business administration (policy determination) and business management (policy execution) are in my judgment a significant contribution to a new business philosophy, a philosophy which puts human personality above material things and regards organic growth as the true test of all wholesome organization.

Two words seem to me to give the essence of Miss Follett's paper. These words are: *function* and *coordination.* If I understand Miss Follett's use of the word "function" it means two very fundamental things which, when taken together and put into effective operation, are of far reaching significance to business executives. These two ideas are based upon the *facts* in any given situation and the *personalities* responsible for collecting, evaluating, interpreting and applying the facts. Miss Follett, in other words, is pleading for a scientific, humanized business management. Put in her own words, she would have authority and responsibility in the work relations derived from function. This means that managers, supervisors, operators, personnel directors, employee representatives are not so much concerned about their particular authority, their rights to hire, discipline, discharge, etc., as they are in getting their minds on discovering what the *facts*—the laws—in any given situation are and where the function in question should in reality be placed.

Put in still another way, as I understand Miss Follett, *authority* should accompany personality, knowledge, experience. This is a law that holds no matter where it happens to hit, whether at the top, the middle or far down the line.

The underlying principle is that there is a mutual relationship in industry and that in order to be truly constructive this relationship between realities and personalities must be one of harmony and accord. In order to effect a true covenant, this relationship must be conceived and carried out on the threefold basis of faith and mutual understanding, facts cooperatively established, and the whole process cemented by fair play.

Miss Follett can cite able authority in support of her philosophy of business management. DeTocqueville, in his masterpiece, "Democracy in America," tells us that, "Whatever exertion may be made, no true power can be founded among men which does not depend upon the free union of their inclinations." Are these words of DeTocqueville not clearly in harmony with what Miss Follett has told us? If we are to have true efficiency and harmony in the work relations must not managers and workers, or their representatives, exercise, not superior force, but obedience to fact and to industrial law? Must authority not rest upon proven worth and wisdom, and is wisdom not the result of contact, conference, discussion and mutual understanding?

Most executives, I feel sure, in reading Miss Follett's papers—I say "papers" because I have read several contributions the past year from Miss Follett's pen—would say that she is highly theoretical, that her ideas are not practical. I had a similar feeling the first time I read her contributions to the science and art of business management, but I am glad here at this time in the presence of the members and guests of the Taylor Society to state that Miss Follett's ideas if *properly understood* and sanely applied are not only practical but I believe they will be found increasingly *essential* in any scientifically organized and humanely administered industry. I feel sure that I am rendering Miss Follett a personal service and voicing the feeling of business executives who have read her writings when I say that her business philosophy would be wonderfully enhanced in acceptance by business executives and hence widened in service if it could be presented in more direct, simple language. The average business executive is not willing to take the time to stretch his mind on many of Miss Follett's most penetrating sentences. One of our most wholesome tendencies, it seems to me, is the growing, honest effort on the part of scientists and busy business executives to get together. Mutual understanding and effective cooperation must rest upon a common language.

As I stated earlier, the essence of Miss Follett's philosophy is *coordination* as an executive problem. Coordination is a difficult problem in a large scale, far flung organization, with scores of units scattered all over thousands of miles of territory. In such an organization many obstacles to perfect coordination must be overcome—internal, conflicting purposes arising between staff, regional and plant divisions; between sales and production; between production and personnel, etc. In the understanding and overcoming of these obstacles in the company I am associated with we have found Miss Follett's ideas of practical, *cumulative* value. She has helped us get our minds away from personalities and keep our thinking on the job. She has helped us define function more sharply. She has helped us appreciate the importance of conference, committees, good will and mutual understanding. I am sure that this process has helped us all to become more scientifically minded and increasingly to respect each other.

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[2] Chairman of the Board, Continental Baking Corporation, New York.

External obstacles to perfect coordination are also serious in a large company. Such handicaps arise from customs, laws, political prejudice, special interests and groups, employers' or trade associations.

Coordination is often hampered because of faulty organization policies. The structure and functions of business are indefinite, unbalanced, or not clearly understood; the personnel is not competent for the functions assigned. The attitudes, potentialities of personnel toward policies is given inadequate or unfair consideration. Stubborn prejudices often abound.

Now, Miss Follett would have us recognize the obstacles, prejudices, etc., to perfect cooperation and she would have us substitute positive measures for the disintegrating of prejudice and continued promotion of coordination. I have not the time to go into the detail of the technique and mechanisms we have found helpful in breaking down prejudice and building coordination in our company such as quarterly conferences for executives; regular systematic operating and personnel committee meetings; established research procedures, and a training program for *all* the higher executives of the company, including heads of major divisions, regional managers and plant managers. All these groups are now active in a formal training procedure and all are getting a *real kick out of it.*

As I understand Miss Follett's argument, she urges us to build policy on a basis of mutual ascertained fact, employ conferences and discussions to interpret facts; discover, train and develop those competent to perform essential functions, and through conference, contact, mutual understanding, build good will. She would have a clear cut exposition of policies revealed to all affected by policies and, while not emphasized in the article under discussion, I assume that she would recognize as a part of her business philosophy adequate records of performance and clear recognition and reward for accomplishment.

There are certain strong appeals in Miss Follett's philosophy when its implications are thoroughly understood. Life is a process of change, of growth, of individual and social inheritance. Life is a cooperative give and take process. Life is the *nature* way. Nature works according to certain laws. Nature is constantly changing. There is nothing final or ultimate about it. Nature control is cumulative. This idea of growth, elasticity, change, permeates Miss Follett's entire paper. There is nothing static, fixed, ossified about it. There is real inspiration in the fact that Miss Follett's thinking forces us to keep an *open mind;* nor does she ask us in this thinking, growing process to *sacrifice* or *surrender* any vital thing. The beauty of it all is that the more we apply this new philosophy to business the more we *get* in return. I mean this literally. Return in the sense of service rendered, return in personal satisfaction, return in profit.

I know no stronger appeal to the business executive than the fact that this new business philosophy gives the executive opportunities, influence, constructive power immeasurably greater than the old autocratic, individualistic methods of management.

Henry P. Kendall.[3] I think you will agree with me that a paper which makes a philosophical discussion and explanation of what some of us as business men think of in terms of the purely tangible and obvious is a bit difficult. I feel that my contribution to such a discussion may put me in the same position as the young man who with his fiancee went to the minister's house to be married. After the ceremony he said shamefacedly, "Parson I am sorry I cannot pay you anything because I haven't got any money but if you will come down in the cellar I will show you how to stop your gas meter from registering."

In regard to the matter of control, I think today with greater centralization of business and under the corporate form of management—which means larger combinations of business, more employees and more complications in the field of management—that every manager is trying to organize both line and staff functions, functional management if you will, so that he will have almost no final decisions to make himself.

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[3] Kendall Mills, Boston, Mass.

Miss Follett is quite right in saying that things are now so complicated that in order to make any constructive report on any activity of a company, more detailed study is necessary than the former one man proprietor of an enterprise could take time for.

It has been my observation that the more progressive managers are practically trying so to organize the various functions of their business that department and staff men, functional men, will be as competent, or more competent, with reference to certain policies and decisions than the heads themselves. As I conceive it today the prime responsibility of the man in final authority in a business is so to organize and man those functions that he will have very little to do except to acquiesce and put the decisions of either groups or individuals into a final form.

I was sorry Miss Follett did not, and she could not, of course, in the time given to her, enlarge a little bit further upon what this tendency of division of responsibility is leading to in the case of the one who is supposed to have final authority. My conception of the president's job, when that title carries with it the assumed, the recognized position of final authority, makes it difficult for me to determine just what that man's sphere really should be. As I conceive it, the one man concern is doomed to the field of small business, but I think that there never was a time when leadership was more important than it is today.

It seems to me that no president of a moderate sized company, or of a large company, would assume that all decisions were final with him unless he was in a position so to organize as to—I do not like to say delegate authority, but that is what it is. It is all right to say that you will organize functions and departments of a business and properly man them. That is nothing more than saying that when you properly man them you are assigning responsibility to those men that you have picked out. Of course a confusion of definitions exists here, but in common parlance today this would be understood as delegating authority.

The more successfully a person assigns responsibility and selects the men for responsibility, in both functional, staff and line management, just so much more time he frees for himself to do what I like to call the creative and inspirational side of business, in other words to engage in leadership as against bossing or driving.

I think that the successful heads of business today are doing less and less on major decisions—approving them but assuming less and less authority and responsibility—but doing more and more in the field of manning their organizations strongly and in the creative or inspirational field. Of course without enthusiasm, without team work—and team work means this cross coordination of departments—without that the business cannot, in the terms of a battle, be fought as a whole.

I think Taylor gave the impetus to the combination of functional and line management, and Miss Follett's paper is very helpful in making clear the definitions and in stimulating thinking on the philosophical reasons for things which have developed in the business field out of the necessity for a more cooperative form of management and organization of industry today.

Robert B. Wolf.[4] Miss Follett's paper, like all of her other writings, is very thought provoking and I find myself in agreement with much that she has said.

I quite agree with her major thesis, which I interpret to be that a manufacturing group performing a specific functional service has individuality.

In May, 1915, I presented a paper before this Society, entitled "Individuality in Industry," in which I expressed this belief. I said, in part, "Is it not a fact, then, that the success of scientific management, properly applied, is due to its action in building up the individuality of the organizations?"

As Miss Follett has so well pointed out, it is essential that organization progress be measured in order that decisions may be made in accordance with facts. In other words, "We must have . . . an organization memory, which is entirely apart and separate from the memory of the various individuals of the plant. It is only by having such a place of record, where all things affecting the organization as a unit can be recorded, that a proper perspective can be obtained. A gradual development of such a memory . . will tremendously accelerate the rate at which the organization will progress, just as in the individual the addition of new concepts to the brain tremendously increases its reasoning power."

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[4] Manager R. B. Wolf Co., New York.

The paper from which I have quoted was written after some years of actual operating experience and in it I endeavored to emphasize the fact that the individuality of the plant could only be really strengthened when we used this individuality as a means for developing the individuality of the men of which it was composed. In this paper I said, "I sincerely hope that in outlining this philosophy of management, I have indicated to you how an organization can be made so conscious of itself as to realize at once when the human units of which it is composed are not being given proper opportunity for self expression, or to realize as well when these same human units are not receiving the sympathetic help they need for their own individual development."

I am not referring to this paper for the purpose of detracting in any way from the novelty of Miss Follett's contribution, but in order to confirm her observation by relating the conclusions I arrived at, as manager of a large plant.

Miss Follett points out that writers on business management speak of "ultimate authority" and "supreme control" as two functions of administration and it is her belief that these expressions are being used because they are the survival of former days and do not describe business as conducted today. I would like to issue a word of caution at this point in the discussion, for it seems to me that we are, at the present time, in a period which represents the swing of the pendulum to the opposite extreme from the imposition of arbitrary authority, probably due to the fact that the discovery of the value of functional management has led its enthusiasts to over emphasize this point of view, with the result that the individuality of the organization is not giving the human units, of which it is composed, the maximum opportunity for creative self expression.

I have had many a young man in recent years come to my office to find out if I could assist him to get work in a small concern where the legal and accounting type of mind had not set up a system of "red tape," which he felt retarded him.

As I look back upon my own manufacturing experiences, I recognize that the greatest success has been obtained always where responsibility has been thrown upon individuals for results, in such a manner that there was no division of authority for the responsible execution of a function.

I believe that most of our confusion is due to the fact that we are not clear in our definition as to what is meant by function. I would like to ask Miss Follett to enlighten us on this point, for frankly, when she says "every man performs a function or *part* of a function," I am a little confused as to her meaning. Is there such a thing as part of a function, and is it not true that every man who does an individual part is performing a complete function, for which he is responsible; and is it not likewise true that a measure of how well he is performing his function must be made in order to enable him to perform his function intelligently?

Perhaps scientific management, as frequently practiced, in its efforts to do away with hierarchy of position, has overdone the matter in its attempt to eliminate arbitrary autocratic control where decisions are made upon insufficient data.

I would like to see discussed in this meeting the question as to whether there is a legitimate hierarchy of function. Perhaps many of the drawbacks resulting from the over emphasis of horizontal functions are due to the fact that we have failed to recognize such a hierarchy.

I would like to ask Miss Follett to define what she would consider to be the function of the President, for it seems to me that if he is responsible for the function which is represented by the complete operation of the plant, his responsibility is for *everything* that transpires within the organization. This does not mean that he should attempt to make decisions about matters so far removed from his own actual knowledge of all factors that his decision cannot be sound. He necessarily must "delegate" (if I dare use the word) to the individual responsible for separate functions the authority to make decisions pertaining to these functions. This delegation of authority is no more autocratic than the "definition of a task."

I quite agree with Miss Follett that in an organization, which functions properly, information is continuously made available at all points where decisions must be made, so that the likelihood of making a decision which will not harmonize with the whole operation will be reduced to a minimum.

I also quite agree with her that a decision is merely a moment in the process and that, in any well organized plant, the individual responsible for the function has no choice but to accept decisions that are practically ready made before he exercises the momentary step which is called an authoritative act.

I have observed in large corporations, with considerable concern, the retarding effect of failure to definitely define functions, in order that responsibility for each function may be laid upon a specific individual, and while I believe, as Miss Follett indicates, that there must be more definite and more conscious interweaving of functions, I cannot visualize a composite general manager. I believe that the slow progress of many of our large corporations can be directly laid to the fact that our legal minded friends have injected too much of the "checks and balances" idea through the use of the committee system.

I believe that the close contact, which Miss Follett speaks of, through committees is important, but I doubt whether committees, as such, should have specific authority. The committee meeting is merely a step in the process which enables those attending the meeting to more intelligently perform their specific function when they return to their place of authority in the organization.

Such statements as Miss Follett approvingly quotes from Franklin Lane's report, that there should be "more opportunity for planning, engineering, and statesmanship above, and more fixed authority and responsibility below," indicates that she is not opposed to the views that I have been presenting. However, I wish she had been more specific in her definition of what she considers to be an answer to the tremendous amount of unrest in our ranks of men engaged in productive work because of a feeling that responsibility *is* being taken from them.

In conclusion, I would like to suggest that perhaps much of our difficulty is due to the fact that we have attempted to create functions by arbitrary definition, rather than allowing them to arise naturally out of the nature of the work to be accomplished. I know that I was never able to get the best results until I succeeded in developing an individual who was conscious of his responsibility, not only for quantity, but also for quality and cost of operation. The feeling of responsibility for the quality and cost aspects of a function was stimulated in the minds of superintendents, department heads, and foremen, and, in many instances, in the minds of individual workmen.

If, however, we create an arbitrary division of function, holding one individual responsible for quantity of output throughout the entire plant, another for quality of work, and still another individual for economy of operations, have we not departed from the true meaning of function, and attached authority to something which is frequently an artificial concept devoid of any real sanction attaching to the nature of the activity it is designed to control? Inevitably, the effect is a weakening of the feeling of personal responsibility.

Perhaps scientific management has, too often, attempted to replace personality by a system. At any rate, my plea is that the development of personality be given *first* place; for it is my experience that neither systematic purpose nor the other legitimate purposes of industry can best be served unless we recognize the fact that in any correlated group of activities there exists a natural functional hierarchy, and that the foci of these functions are always individual men.

Richard A. Feiss.[5] I had the good fortune of looking at this paper in a more or less intimate way before it was presented and made copious notes about things that I could say in comment, but I have just decided to tear up those notes and limit my remarks to some of the thngs that were suggested by the foregoing discussions.

I think that the chief thing that Miss Follett has made clear is that after all the things that we are dealing with in business and in organization are relationships, not concrete things.

I can say, in partial answer to Mr. Wolf, that I think Miss Follett means in speaking of functions those clearly defined relationships which have been brought out either in the up and down or the cross section of an organization. When we are speaking and thinking of things in these terms we find that we have not in our relationships the thing that was meant by authority in the past.

It is true that Mr. Kendall in his discussion used authority, I believe in the same way that Miss Follett used responsibility and I was asked by my neighbor what the difference was. I believe that is a question very pertinent to this paper. I think the answer is that there is no difference except in the attitude one has, or the reaction of a person or a group of persons in an organization to certain relationships in terms of authority or in terms of responsibility. These words do mean a different attitude rather than a different thing, and that after all is what we are getting at.

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[5] Consulting Management Engineer, Boston, Mass.

We are trying to get at that attitude which looks at business and the business organization as merely a partnership undertaking in clearly defined spheres—that is, we are speaking in terms of function—where all share in responsibility toward a common objective.

The great difficulty that underlies this thing, as I see it, is to keep the common objective in mind in a practical way throughout the organization. You cannot keep such an objective in mind on the theory that Miss Follett has attacked; namely, that of authority and the ability to delegate authority, which involves giving or loaning to somebody something which you have.

So far as a definition of various positions in an organization is concerned, such as the president and others, I do not believe they are at all material. I believe that the material thing is the attempt that Miss Follett has made to define the relationships which must be carried on by groups of people and not by an individual in an organization. Otherwise there cannot be any relationship between groups of people with varied responsibility.

I think we have missed another point and that is that the definition of those relationships is *the* important thing. In the administration of business or in the organization of business the important thing is the constant analysis of function, the constant clarifying of relationships. I do not believe that the mechanism used is of the greatest importance. Miss Follett, I think rather unfortunately, mentioned the so called interlocking committee and I am glad that she stopped long enough to correct herself, or rather to explain that it was not the only means of coordinating or integrating these various relationships. In fact it is one of the mechanisms that to my mind is rather doubtful. I do not believe that a committee can be successful unless membership in that committee is composed distinctly of responsible functionaries; in other words, of people who are responsible for functions that are well defined.

There cannot be control unless this is true. The field of control, however, is a very much broader thing and I hope Miss Follett will enlarge upon it in the future. We are all inclined to express ourselves in terms aptly found or handed to us by Miss Follett. Control, not in the sense of one man's power to do things, but in the sense of our ability to make the facts, an expression which I have also borrowed from Miss Follett, is the thing that we are after.

I believe that scientific management is more interested in making facts, in creating conditions that are controllable and that contribute to the main purpose of an organization than in a mere analysis of conditions that happen to exist.

If I have contributed anything to the discussion I hope it is some clarification of what is meant by the type of control that I believe Miss Follett has in mind. I could speak at great length on many other phases of the paper but I do not wish to take any more time.

I think that those of us who have been struggling along with management as a science, as an art or as a profession in the past years have learned at least to substitute the word responsibility for authority. I am glad to say that in twenty years of active work the word authority was not once used in our organization, at least not in my presence or in the presence of the managing group. I believe that Miss Follett's contribution is a clearer and more definite expression of the thing that we are grasping at in our attempt to express what real leadership is today.

N. I. Stone.[8] I appreciate the thought provoking suggestions in Miss Follett's brilliant paper but her disagreement with the generally accepted thesis that a president delegates his authority inclines me to agree with the points made by Mr. Kendall and Mr. Wolf. I think this is more than a matter of difference in terms, definition of terms or words.

It seems to me that we cannot really speak of that function without looking into the underlying forces that determine the president's position. In every business a man is a president of the company either by virtue of the fact that he owns it or is a dominating factor among the owners, or has been given the authority of president and the responsibility for the fate and conduct of the business by the owners represented in the board of directors. The whole weight of the responsibility for the success of the business rests upon his shoulders. The board of directors look to him, or if he is the owner he has to look to himself, to find the right people and to develop the proper organization to do all the things necessary to make the business a success. The responsibility is in him and responsibility means authority.

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[8] Consulting Management Engineer, New York.

This responsibility to those who entrust him with the affairs of the business, and the authority which he exercises over those whom he employs, or gets into positions calling for the discharge of certain functions, is the responsibility of the president.

The president theoretically and actually is responsible for every function of the business. Naturally the larger the business the less is it possible for him to attend to the details of the functions. Therefore, his business is to find the right man for the right job and see that the function is properly developed or defined, and last but not least, to coordinate the jobs. But he does delegate the authority because the authority is vested in him by the owners who will be vitally affected by the success or failure of the business.

In every business you have departments which are naturally in conflict with each other, although each works for the benefit of the business. Somebody has to have the final say where the heads of these different departments differ, and that must go to the source of authority, who in this case is the president by virtue of being the owner or by virtue of representing the owner.

Chester F. Lay.[7] I have read a good deal concerning the growth and acceptance of the profession of management. If, however, the president or anyone in a managerial capacity must get all his responsibility or authority from the owners and express it only through the engineers then I for one cannot see wherein there is any place for the profession of management. The manager is a hireling only. If management is to be a profession the president or manager must feel, regardless of who pays his salary, that he has responsibility to his employers, his employees and to the public.

Note: Charles Vezin, Jr., Scudder, Stevens and Clark, New York, suggested reference to the essay on "Responsibility" in John Grier Hibben's book "A Defense of Prejudice" for supplementary material.

Closure

MR. WOLF has asked me the most pertinent question that could be asked, I think, and that is to define the function of the President. Such definition is necessary for any adequate consideration of the subject of Authority, but I feel that there is not time now for any treatment of the President's position which would be in the least satisfactory. I regret this not only because a statement of my conception of the President's function would, I am sure, throw light on my whole position throughout this paper, but also would make it possible for me to defend further the validity of my contention that "delegation of authority" has usually a different connotation from "definition of task," which Mr. Wolf seems to doubt. Of course, the first consideration here would be the *origin* of authority, and it is obvious that that would require a separate paper.

I should like to add that when Mr. Wolf points out that there is no such thing as "part of a function," I agree. Strictly speaking there is not, and I should not have used that expression.

EMPLOYERS pride themselves upon being the responsible class, the captains into whose hands has been given the piloting of the economic ships. They pride themselves upon possessing the equipment, the mental and moral make-up, the traditions, and last, but not least, the self-control which justifies them in directing the industrial organization of this country. Because they have been given what they regard as superior experience and training, they feel it would be dangerous to turn over the command to others. They are impatient, and often justifiably so, when dabblers and inexpert amateurs offer a priori panaceas with which to solve their problems, or fumbling hands attempt to interfere with the delicate mechanism of the industrial processes. This very superiority in training and experience would seem to carry with it certain obligations. They should start afresh in a constructive and scientific spirit to discover what it is that wholesome employer-employee relations require. (Sam A. Lewisohn, "The New Leadership in Industry," p. 76.)

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The Practical Man in the Making[1]

One of the Functions of the Teacher Is to Serve as Responsible Harmonizer of Theory and Practice

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A KEYNOTE of management science as conceived by Mr. Taylor is the fortifying of the humblest laborer with the best known standards for a given job, imparted to him by foreman or supervisor, whose chief function is that of teacher. To Mr. Taylor and his best exponents management was in essence an educational enterprise, else it could lay no claim to be called scientific. That a view at once so promising for prosperity, and in line with American tradition in the use of man-power, should have had a relatively slow advance and be still strongly opposed by the laboring multitudes who stand most to gain by its practical applications argues something amiss. Is there anything wrong with the program of science in management? Or does the fault lie with interpreter and interpretation of what it really is and does? In other words, may we trace the not yet quelled hostility on the part of workingmen and the too prevalent inertia of employers and executives, in part at least, to some lack in the preparation of exponent and user of management science?

The Legal Profession and Its Problems

In the making of the modern administrator of man-power technique may we not have overlooked, or given less than needed emphasis, to some saving and perhaps decisive factors? I am merely raising the question; not giving judgment, and I do so by reference to a field with which I happen to be familiar, as a lawyer concerned with organization problems—that of the law. Our inherited system of the common law, our law administering institutions, triumphs of Anglo-Saxon common sense as we all recognize them to be, nevertheless leave us today in a state of doubt and dissatisfaction. Not all the 20,000 lawyers of this metropolis avail to keep us the law respecting and law abiding community that we should be. At this very moment a strike in the needle trades, now five months in duration, a fact in itself quite damaging to self-complacency, is daily marked by a reign of terror, gun play, acid throwing by gangs invading business premises, and by other outbreaks which take us back to the worst of frontier conditions.

The cynic will say, to be sure, that the very abundance of legal talent, such as it is, might possibly have something to do with our present afflictions. In a sense, such a pleasantry, like many a jest, may not be so wide of the mark; anything which provokes self examination is always wholesome discipline. Einstein has said that all that he did was to question a truism. A most significant movement of the present day is the raising by the Harvard Law School of an endowment fund for research—a novel idea in connection with the making of a lawyer! But this school started the case method of teaching law, and it pioneers once again with the novel proposition that law is not a frozen mass of unchanging doctrine and tradition but an expression of human relations and living purposes. As such, research—not in the historical sense but in the familiar scientific exploratory sense—is needed in order to insure vitality and to fit the practitioner, however practically competent, with some outlook beyond the daily bread.

The Purpose of Research

Is not the prime note of all research work a looking backward for the purpose of looking forward—the note of true educational work, of scientific work? Indeed, that is what makes science differ from dogma. Routine in a busy world, and with the human animal as he is constituted, has its large and permanent place. But so has discovery. The main concern of education and all application of it in the work of the day, of management and of life's activities generally must surely be to strike a workable balance between tradition and departure, between the accepted and the original, in short, to equip student and executive alike for a profitable tussle between *routineering* and *pioneering*. How to restrain the knowledge that we have from becoming an obstacle to more knowledge that we might have is a nice problem in individual psychology.

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[1] Paper presented before the annual meeting of Teachers of Management, held under the auspices of the Taylor Society, New York, December 8, 1926.

Mr. Taylor's Method

Mr. Taylor succeeded, to a greater extent than any of his contemporaries, in lifting management practice from the realm of gossip to that of law—from whim to a procedure that should govern executive and operator alike. To reach the governing rule he went through an immeasurable process of detailed examination, discarding assumptions, indeed treating them as nonexistent, and by tireless building up of minute data, he formulated operating procedure that could be bettered only by an equal or even more painstaking examination. In no respect was Mr. Taylor's thinking less autocratic and more American in spirit than in his quest of the one best way to do a given task. That the spirit of his procedure has not always been followed in the practical application of it, that less of the painstaking quality and respect for all available sources of cooperation has sometimes marked the methods of installation, merely proves that the best of schemes can work no magic by itself, and that vigilant self criticism and apprehension of the dangers inherent in converting discovery into routine are among the tools for winning practical success.

A management program such as Mr. Taylor's has sometimes in practice been associated with an impatience of what was characterized as theory and irrelevant abstraction. With a program that was notably builded on a defiance of assumptions, a host of assumptions now and again crept in, as one executive or another started out to install his new system of management. These assumptions had to do mostly with the economic aspects, or to use a vaguer phrase, with the human aspects of the installations.

The hater of theory and abstraction, that is to say, the uncritical practical man, so called, in reality never more pathetically loses himself in cloud and fog than when he fails to do his economic thinking with something of that honesty, humility and rigor that he has learned to use in his administrative work. In management, both human and material forces challenge all that one has of skill, information, insight and power of adaptation. Theory is an ingredient in power of adaptation. One need have no fear of theory that is a result of the same mental processes that mark the shaping of material operating programs. What is mischievous is half baked theory, untested assumption, the prejudice that masquerades as judgment. No man is ever without his theories and speculations.

But in the scientific mind theory is an honored guest; abuse of hospitality leaves its mark on the imperfectly made practical mind. The static in his thinking cries aloud for correction. I have always been impressed by the speculative range of Mr. Taylor's mind—a large ingredient in the charm of his conversation and his outlook on industry and American civilization. That his urge to make work less wasteful made him seem at times impatient of any but the most direct routes need not blind us to the less tangible qualities that played a large part in shaping the mind of the man after whom this Society is named.

Benjamin Franklin was as practical a man as ever lived. It is not generally recalled that he was one of the most cultured and cultivated men of his times—an inventor, a business man, diplomat and philosopher; at home with tools, at home with men and at home with ideas.

In the discovery of radium by the Curies all the mental operations up to the use of pitchblende were inductive; after that every step taken by them was pure deduction based on their carefully reasoned a priori assumption of an unknown substance.

Maxwell foretold the existence of electromagnetic waves from his equations twenty five years before their demonstration by Hertz. Our radio age is his brain child; as our chemical and metallurgical civilization owes a debt that can not be paid to the modest self effacing Willard Gibbs, who more than a generation ago at Yale University worked out the basic industrial formulae of thermodynamic chemistry. Please note that Gibbs preoccupied himself not with manipulations so much as with meanings. To conventional thinking he sought to bring some of the art of thinking straight. This man known to his time, where known at all, as a mathematical theorist and nothing else, appeared to a few of his enlightened contemporaries, as he now does to the wisest leaders of our industrial civilization today, as one of the few men who did the most to make that civilization possible.

"Inert Ideas"

A Franklin, a Gibbs, a Taylor, find that their hardest fighting must be done against "inert ideas." The untaught man has this advantage over the so called trained man who has not had his attention drawn to the mischief which inert ideas can work; the untaught man somehow puts to work such modicum of thought or idea as he may have. What he has is in working order. That is why you recall a talk with such a mind as an addition to the stock of wisdom and the language with which such a mind speaks as a reminder of the original strength of our common speech unthinned by bookishness.

Throughout my teaching years I could never, nor do I now, distinguish between a type of training supposed to make for culture and another for practical power. What these terms can possibly mean in a democracy I have yet to learn. Pedantry and snobbishness may suggest where the Chinese Wall may be found, but if we know what our proper business is we do not need to search far for the normal integrations between culture and special knowledge, structure and use, abstraction and application, theory and practice.

An Oxford professor whom I know, dealing with that most abstruse of all possible subjects, that of ancient manuscripts, was surprised to find among his interested auditors in a small lecture course that he gave a man whom I heard President Eliot describe, when he gave him an honorary degree, as the greatest living medical consulant. I refer to the late Dr. William Osler.

Mr. Taylor said in his address at the dedication of the University of Pennsylvania Engineering school in 1906, "I look back upon the first six months of my apprenticeship as a patternmaker as, on the whole, the most valuable part of my education." I wish that he had told us more about that formative period. He recurs to it now and again but rather sketchily. Very early he gave shape to that vitalizing impulse of his to convert a nation of amateurs into expert workmen. And the vision he had of labor was the transforming one of turning the Biblical curse into activity which held some element of that joy taught by the monks of old. Technique, like labor saving machinery, helps toward such a release; so does practical appreciation of the intrinsic and varied qualities of manpower. William James said that the main object of education is to help us know a good man when we see one. A power to secure sound performance, finished work with minimum outlay, when coupled with the gift to enlist will-power, is the high-water mark of competent management. This calls for technique and something more. Experts in the discovered and experts in discovery are not often provided for in one and the same plan. In our view of the making of the practical man some provision has to be made for an understanding, a sympathy, with both types of achievement, and the capacity to work with them.

Carlyle's definition of religion is "the thing that a man does practically believe," a compound of faith and technique . A tag maker in the town of Framingham, Massachusetts, found a way to make tags and partners at one and the same time.

Facts and Philosophy

Your insistent fact hound may sometimes reveal himself to be a deeper visionary than he would care to admit.. The man who made science teaching a national interest and joy in this country, who trained about every naturalist of note in the generation that is passing, was Louis Agassiz, whose museum in Cambridge is one of the world's greatest. He had use, he said, only for men who could bring him facts. He chided the theorist. Among his famous sayings was the one that he had "no time to make money." Time has had its revenge, I may say in passing, by making his son the developer of the famous Calumet and Hecla copper mines, and his gifted grandsdon, the present head of this company. If ever a man was an example of a shining faith, of a philosophy of human relations and service, it was this fact exacting teacher, inspirer and founder.

Whatever may be the concrete showings of the organizer and administrator, he betrays impoverishment in the extent to which he ignores the debt to the abstract thinker and theoretical experimenter; in the degree to which his own mind is inhospitable to speculation, theory and abstraction. The civilization which nourishes us today is the creation of the Agassiz, Gibbs, and Taylors far more than of the Fords, and the hope of the future lies at this moment in the obscure incubations of such genius. May they not be hampered in their work, wherever they may be.

When President Harding sent me on a mission of investigation to Russia in 1922, I happened to arrive at the time Lenin was urging the introduction of the Taylor system, in his search for something to relieve the misery that was upon that unhappy country; at the very moment that the American Federation of Labor was fighting what it called the stop watch, speeding up system of the efficiency engineer. Any intelligent American working man could have told the Russians what was wrong with their industrial experiment; could have predicted, in fact, what would happen when the normal incentives to production were disregarded, discipline made a debating exercise, management a mob result, and pride of possession taboo. Lenin alone, among the Moscow people, in the early days, had the wisdom to see that when he and his associates started out to abolish history, they scrapped at the same time the laws of arithmetic. Karl Marx never warned about that, and as his disciples were as fatally uncritical of his gospel and theories, they clashed with the grim untaught peasant who had never heard of Marx and only knew that two and two make four under any system under the sun. And this dreamer-realist, this peasant, who works hard when he can work, and goes into long periods of meditation, has forced year by year recessions from the most extreme doctrinaire position ever taken by any government in history.

Balance Between Theory and Technique

Neither theory nor technique can go it alone; the method of the backward look for the purpose of the forward step cannot be safely put aside in practical life. Specialize to the limit, theorize to the limit. Somewhere we want to see the tying force at work, the balance struck; if not by the specialist and theorist respectively, then by the responsible intermediary. That person, largely, is the teacher, or the person charged with teaching functions, and the privilege in his task is that of furnishing the connecting link, the historical as well as the pioneering sense, to those within the range of his influence. This link helps to save what is worth saving of the past, illumines present effort and paves a road for the needed next steps.

A Course in Appreciation

A portion of every technical curriculum might well include a course in "Appreciation." It would deal with founders and pioneers, dreamers who awakened doers, and doers with visions often beyond and behind their triumphs. This would be a training in a sense of kinships and obligations, in respect for the many kinds of ideas and sacrifices that make us what we are and give us what we have. It would make for humility as well as for invigoration. It would help make the practical man *a man as well as practical.* And that would give him a place among the men of faith and deeds; for he would courageously own to a point of view, a philosophy, if you will; and as we have seen, I hope, the men we do homage to and pattern ourselves by exemplified that union of faith and power. The kind of practical man that we most want to see made is the man who knows both the good job when he sees it and the good man who is doing it.

THE executive who follows an impulse usually relies upon some emotional stimulus, and in the majority of cases this reaction points to exactly the wrong thing to do. The leader who lets his impulses guide is a good leader only for a mob, and we have no place for mobs in industry. Good leadership requires careful penetrative thinking and it requires absolute self-control. It is through the mind with its power to guide emotional pressures into constructive behavior, that man has progressed. If he had depended solely upon his habits and feelings, he would still be living in caves. An organization must be marshaled forward by reason. The executive must think his way along and his desires and actions must conform to the decisions of his mind, rather than to the unguided surges of his emotional nature. (Erwin Haskell Schell, "The Technique of Executive Control," p. 2.)

Management's Concern in Research[1]

As an Aid in Establishing Operating Procedures, in Making Managerial Decisions, and in Developing a Science of Management

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AT DISCREET intervals I take the liberty of injecting myself into the program of a meeting of this society for the purpose of fulfilling what I conceive to be an official duty; namely, to give the report of a scouting expedition into territory with which management is vitally concerned and into which most of our members are unable to make personal excursions because of the exacting demands of their executive responsibilities. The territory on which I desire to report today is that of research insofar as it concerns management; its importance to management and its methods. The research and the methods to which I shall refer especially are those of the social sciences. The methods of the physical sciences with which management is concerned are well established and well understood, but the methods of the social sciences with which management is now more critically concerned, are not so well established and well understood. And insofar as management is concerned with human beings individually or in groups as consumers and as producers of goods and services, it is a social science.

I. Research as an Aid to Practical Management

We may feel confident that no one who has had extensive experience in management, or has made serious study of it, will question the value of research to the responsible executive of these days. Therefore our attention to that phase of this report should be primarily for completeness of the record and may be in the form of propositions.

1. Management involves problems relative to purposes, policies, programs, projects, plans and procedures; decisions are made by rational consideration of pertinent facts; the validity of a decision depends not only upon the soundness of the rational considerations, but also upon the completeness and accuracy of the facts.

2. The development of a complicated industrial organization has generated problems of management which are critical, perplexing and exacting in their demands for rational determination on the basis of facts which are numerous, and difficult of ascertainment and valuation.

3. The range of facts required by management in making its decisions is indicated by the following classifications: Facts relating to—

a. Materials: their fabrication and consumer uses.
b. Progress of the arts employed in industry.
c. Organization for and direction of transformative and distributive processes.
d. Human individual and group reactions to organization and direction procedures and relationships.
e. Consumer demand, and the general and particular markets.
f. Industrial tendencies pertinent to long-run planning of policies and programs.
g. Environmental influences such as social customs, government regulation and international relations.

4. It is a large undertaking to procure facts of such a range, and after they are procured the processes of analyzing and evaluating them are complicated. They cannot adequately be procured and evaluated in a casual way, or even in an organized way, by those engaged in executive activities. To meet this situation research organizations to serve executives have come

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[1] Paper presented at a meeting of the Taylor Society, New York, December 10, 1926.

The following current discussions of method in economics are pertinent:

Lawrence K. Frank, "The Emancipation of Economics," *American Economic Review*, March, 1924.

Wesley C. Mitchell, "Quantitative Analysis and Economic Theory," *American Economic Review*, March, 1925.

Frank H. Knight, "Fact and Metaphysics in Economic Psychology," *American Economic Review*, June, 1925.

Warren M. Persons, "Statistics and Economic Theory," *Review of Economic Statistics*, July, 1925.

John Candler Cobb, "Quantitative Analysis and the Evolution of Economic Science," *American Economic Review*, September, 1926.

Matthew T. McClure, "How to Think in Business," McGraw-Hill, New York, 1923. An elementary exposition of the point of view of John Dewey.

into existence; research units of individual business organizations, cooperative research organizations serving groups of enterprises, independent research organizations equipped to serve industry in a professional capacity, and research units of educational institutions designed to serve industry as well as to train young men in research technique.

5. The conclusion is inescapable that research has become an important function in management, that it is a responsibility of management to stimulate, support and utilize it, and that, for wise utilization, management should keep itself informed concerning undertakings, contributions and methods of research.

II. Research as an Aid to the Development of a Science of Management

This complexity of the industrial organization, and the consequent complexity of problems of management, has inspired efforts towards what is essentially standardization of elements of the managerial situation of far-reaching importance. In increasing number, enterprises are defining purposes, which is a standardization of objectives; defining policies, which is a standardization of general methods of achieving objectives; and formulating procedures, which is a standardization of particular methods of achievement; the underlying purpose of these efforts being to substitute constants for as many as possible of the variable elements in a managerial situation. Likewise industry as a whole (and this is the significance of the management movement) is attempting to define universally applicable policies and procedures, or at least discover universally applicable methods of defining these in any particular situation; and to this end it is searching for a body of underlying principles, a set of standards, a science of management. Furthermore, recognizing that progress is but a continuing adjustment to an ever changing environment, and that there will always be in industry as a whole and in each particular managerial situation, new elements and new problems, management is striving for principles and methods of solving this succession of variable problems with promptness and with maximum probability of accuracy.

It is inconceivable that progress in this direction can be substantial unless industry recognizes research as one of its functions, and has as much concern in research—its nature and its methods—as in any science or art in which management now has concern. It is for this reason that the Taylor Society inaugurates today a series of sessions on methods and instruments of research.

III. The Evolution of a Science of Management

Assuming that we do have the beginnings of a science of management, this embryonic science will undoubtedly evolve through those stages which, with variations, have been common to the established physical and social sciences. In striking respects the social task of "thinking out" a science is analogous to the individual task of "thinking out" a solution of an individual problem. Either process may be indicated crudely as follows:

1. a. Imagination, or more likely, uncertainty about what action to take in a concrete situation, creates a problem. This establishes the necessity of examining the pertinent facts for the purpose of deriving a conclusion or making a decision; which stimulates—

1. b. Inductive reasoning, or analysis of the facts, which yields general conclusions concerning the facts. The application of these general conclusions to the particular problem, by using them as premises in a process of deductive reasoning, results in—

1. c. Formulation of alternative conclusions or decisions, no one of which is satisfactory because it does not solve every phase of the problem. The most satisfying of these conclusions is adopted as the basis for immediate action; the others stimulate the beginning of a new cycle, as follows—

2. a. Redefinition of the problem, including active exercise of the imagination, and the accumulation of additional pertinent facts; which stimulate—

2. b. Analysis of the more complete facts and derivation of more substantial general conclusions. Deductive application to the problem of these more substantial premises results in—

2. c. Formulation of more positive conclusions or decisions. But new experience discloses the inadequacy of these conclusions or decisions, which stimulates the beginning of a new cycle, as follows:

3. a. Further redefinition of the problem, aided by imagination, and refinement and extension of methods of accumulating additional pertinent facts; which stimulate—

3. b. More intensive and fruitful process of inductive reasoning; more rigid deductive reasoning from more stable premises afforded by the more abundant facts; which stimulate—

3. ¢. Formulation of conclusions or decisions in the nature of formulae concerning relationships of coincidence, sequence, relative frequency, or cause and effect; the beginnings of a science which permits formulation of standard and dependable procedures in the arts governed by the science.

But new experience, the discovery of new facts, causes questioning of formulated principles, or at least of their completeness, and stimulates the beginning of a new cycle; and so on *ad infinitum.*

It should be realized that this picture of the total process of "thinking out" a problem or a science is artificial in that the elements of the process in actual experience are not so separable. The whole should be conceived as a shuttle motion back and forth between facts and conclusions, of such rapidity that inductive and deductive reasoning become but different aspects of the same integral process.

Students of method are generally agreed that the evolutionary development of method in the several sciences has proceeded, with variations, through these stages:

1. *The Deductive Stage*: in which emphasis is on the processes of reasoning from facts and not on the quality, quantity or methods of securing of the basic facts;
2. *The Qualitative Stage*: in which emphasis continues to be on deductive reasoning, but in which attention is given to securing a greater quantity of facts and especially to defining and classifying their characteristics;
3. *The Experimental and Quantitative Stage*: in which deductive reasoning continues to be the essential final step in the solution of a problem, but in which emphasis is placed on observation of facts under controlled conditions and on analysis and comparison of large quantities of facts.

It is to be observed that in these brief and inadequate statements concerning the development of scientific method, three elements have appeared and reappeared—the accumulation and analysis of facts, imagination, and deductive reasoning. Because imagination can and so frequently does deceive and mislead as by pretending that the results of its processes are established facts or conclusions, we are inclined to underestimate its importance. Because deductive reasoning was highly developed early in our culture, we have become so accustomed to it as to forget its significance. That which we are now inclined to emphasize, because its technique is being enriched every day, is the importance of the processes of accumulating and measuring facts. And it is with this that I am principally concerned in this paper. To be complete and impartial, however, I desire in passing to say a word about imagination and deductive reasoning.

IV. Imagination and Deductive Reasoning

Imagination is one of the outstanding forces in the development of a science. It may play us false when it presumes to tell us what the facts of a case *are,* but it is a great constructive force when it tells us what undiscovered facts there *may be*—what to search for in the wilderness of the unknown. This must have come home to those of you who have read Pupin's autobiography. He speaks with authority on the origin of the electromagnetic theory of light and matter, which has in our day revolutionized the physical sciences. Faraday, stimulated by experiments in his simple laboratory, dreamed about it; Maxwell, the mathematician, the deductive reasoner, proved it must be so; Hertz in his laboratory proved that it is so. Says Pupin:[2] "The general development of this view was due to the gradual development of new physical concepts which were born in Faraday's mind and existed there in a poetical vision; . . . In every creative physicist there is hidden a metaphysicist and a poet . . ."

No industrial organization is complete which does not include one or more dreamer of dreams to originate problems for its research group; no science of management can ever develop without the contributions of those who dream about the management of the future. But these dreamers must know what are dreams and what are facts; they must have that quality of which Pupin says:[3] " . . . in spite of his wonderful imagination and his free use of it, no investigator ever succeeded better than Faraday in drawing a sharp line of division between the new facts and principles which he had discovered and the visions which his imagination saw in the still unexplored background of his discoveries."

Deductive reasoning is the element of total process immediately preceding a conclusion or solution. This method is as all-pervading and essential as is the air we breathe. Facts receive a practical value by treatment in the crucible of deductive logic. Because on occasion its premises or its processes may be wrong is no fault of this process; it is the fault of the user. We should not forget that it is essential, and that it has made some of the greatest contributions to science. Maxwell's contribution to the electromagnetic theory, to which reference has been made, was a *tour de force* of deductive reasoning in mathematical form; the Einstein theory is also a *tour de force* of similar deductive reasoning. The scientific world is this year honoring the fiftieth anniversary of the publication of a treatise by Josiah Willard Gibbs, of Yale University, which made thermodynamic chemistry an exact science. "Without his work many phases of modern industry might still be groping experimentally, trying to discuss laws which he set down before they began"[4]—another gigantic contribution of deductive reasoning. In the field of management Taylor's imagination stimulated a line of investigation in which inductive and deductive reasoning by Carl Barth gave us formulae that put the art of cutting metals on a scientific basis and made these readily available through a slide rule in practicing the art.

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[2] "From Immigrant to Inventor," p. 222.
[3] *Ibid*, p. 223.

No industrial organization is complete which does not possess the genius correctly to apply deductive reasoning to the facts of management which are discovered, to make decisions governing actions with the highest probability of success, and to map out lines of investigation with high probability of important discoveries. This is an important function of committees.

V. The Search and the Re-Search for Facts

In all the sciences utilized by management, particularly in the social sciences and in the science of management itself, the outstanding achievement of recent years has been improvement of the technique of finding and measuring facts. Interest and discussion have been focused on this first important element of the total process of arriving at a decision or solution, rather than the succeeding elements of the total process.

Before there is conscious and highly organized effort to ascertain and measure facts, data are made available by casual observation in experience, and in time of special need by deliberate, conscious observation and by drawing on the intuitions of wise and experienced authorities. Casual observation is unquestionably the most elementary of fact-finding methods, but intuition, which sums up a mass of subconscious casually observed facts, is of great value. It is sometimes indispensable, for intuition frequently discloses master facts, or generalizations from facts of personal experience, which elude capture and measurement by any fact-finding technique and yet may give the key to the solution of a problem. These intuitions may be of service on the one hand by suggesting research for facts by developed techniques, or on the other hand, after scientific methods have made their contributions, by stimulating analysis and appraisal along lines which solve the problem.

The qualitative method also is not obsolete. It will always be important. There is no controversy between qualitative and quantitative methods. In fact the qualitative method is essential to the quantitative method. *What* does the quantitative method count and measure? Try to determine that *what* without the qualitative method! And after the quantitative method has counted and measured, it is frequently discovered that it has not done so without some uncertainties, and it is with respect to these uncertainties that the qualitative method may again step in and give the key to the solution of a problem.

But it must be emphasized that the quantitative method—the statistical method—is the great achievement of method in the social sciences in recent years. Our sociological and industrial literature is full of it, and its nature and uses are familiar to most executives. It was a great discovery that facts of nature—inanimate and animate—have systematic relationships which may be measured; that these measurements disclose "master facts" not apparent to casual observation—norms, trends, relationships of frequency, coincidence and sequence. Most of the recent progress that has been made in psychology, economics and sociology, in perfecting methods of education, in treating mental and moral defectives, in measuring price trends and relationships, in analyzing consumption and markets, in forecasting industrial tendencies, in establishing budgets and other standards of control, is to be credited to the method of quantitative measurement. However, notwithstanding its importance, in fact because it is so well known and so highly valued, I desire to turn our attention to its principal limitations, which are usually not kept sufficiently in mind.

VI. Limitations of the Quantitative Method

1. The regard for quantity in many instances compels a practical (although not necessarily an intellectual) disregard for exactness of quality, and results in the setting up of more or less unreal units of ob-

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[4] *New York Times Magazine*, November 28, 1926, p. 6.

servation and measurement. A basic assumption of quantitative measurement is that units of a counted and measured group are homogeneous, but many phenomena appear in continuous rather than discrete variation and refuse to conform to that assumption. Furthermore, problems are defined and their factors defined as our conceptions, attitudes and habits discover them. What is a farm; work animal; capital; income; depreciation; surplus; dollar; building; machine; tool; expense; addition to capital; raw material; worked material; tubercular victim; criminal; residence; factory building; and so on? The most critical step in a statistical investigation in the social sciences and one of the most difficult, is definition of the unit of observation; and an equally practical difficulty is getting the observed units listed—included or rejected—accurately with respect to the definition. Even those units which we regard as exact—dollars, pounds, feet—may not have great value in the solution of a problem except as they relate to associated qualities which cannot be included in the measurement.

2. Although the method of quantitative measurement reveals facts of relationship such as relative frequency, coincidence and sequence, it is only in exceptional instances, and then not without doubt, that it reveals relationships of cause and effect. Statisticians appear now to place less value on the method of partial correlation than formerly; it is highly suggestive and indicates lines of further investigation, but only when the correlation is very, very high is it regarded as indicative of any dependable cause and effect relationship.

3. Another limitation of the method under discussion is that it is not yet able to measure the data of a problem which are contributed by consciousness, by individuals as original and independent sources of energy, by individual and group "interests." Individuality implies heterogeneity of units. Measurements of this kind are vital in problems involving explanation, prediction and control in the field of managerial activity. For instance, we can after a fashion quantitatively measure the labor turnover in an organization, but we cannot yet measure the emotional stimuli and reactions which are the causes of the turnover. There are intimate and vital controlling facts of managerial relationship beyond the reach of any existing technique of quantitative measurement.

4. Furthermore, a statistical solution is always the determination of a definite, detail question of fact, which is but a fraction of an integral managerial problem. We must remember that it is a process of fact finding, of "master fact" finding. A statistical investigation is a definite, restricted, laborious, time-consuming process. As executive one is confronted by a problem and one requests a statistical staff to ascertain facts within the scope of their technique. But those are not all the facts involved in making a decision. And in the meantime the problem grows with the passing of time, and the quantity and variety of pertinent facts increases. The statisticians contribute their findings, but these are but part of the data from which conclusions must be drawn and on which decisions are based. A science is so vast that total solution by methods of quantitative analysis of specific detail problems is inconceivable.

5. Finally, in the present state of the science and the art of quantitative measurement generally only those phenomena of conduct are quantitatively measurable which represent mass or group habits more or less rigidly fixed. The most magnificent achievements of quantitative measurement have been in the fields of astronomy and biology. Day by day, year by year, century by century each star of a universe of stars runs its appointed course, and measurements made in 1850 will hold good, except for the human errors involved, in 1950. Therefore, we can keep time and predict eclipses to the second. Anatomical and physiological characteristics of species are mass habits which change by such small increments that apparently they do not change. The modal length and the dispersion about the norm of the English sparrow will probably be the same in 1956 as in 1926. There are certain human mass habits having a biological basis—marriages, births and deaths—which change sufficiently slowly to permit valuable statistical measurements. Even mass habits relating to economic activity are profitably measurable, as is evidenced by barometric indexes. Yet here we get on less certain ground, for a sufficient number of mass economic habits, relatively stabilized during a period of relatively stable environmental influence before the war, are now unstable. Some of the formulae resulting from quantitative measurements made before 1914 are now in doubt.

Management is largely concerned with human conduct and, we are beginning to realize, with elements of conduct of which there is great variability among individuals. We may be able to assume for instance that there will be some sort of standard mass habit reaction to wage payments, but may we continue to assume that the reaction is the same for all classes of wage recipients? We may assume, and we may eventually measure quantitatively, a mass habit reaction to non-financial incentives, but may we assume that all classes of workers react in the same manner or at all? Many critical problems of management are concerned with individual reactions, or group reactions of numerous groups, to stimuli of the managerial environment, and to resolve these we must add to the rich results of quantitative measurement equally rich results of other methods of research.

VII. Other Methods of Research in Management

In the physical sciences investigators are imaginative and bold. Investigators should be not less bold and imaginative in the social sciences—and in the development of a science of management. Too frequently scientists concerned with the industrial field hesitate to attack many important problems for fear the results will not be definitive as results and as tests of method, with the outcome that they are inclined to neglect the difficult and attack the easy problems. Some one has said that to discover incomplete information about an important matter is a greater service than to secure complete information about an unimportant matter. It is quite possible to carry along side by side researches which yield their important results by testing and validating methods, and researches which yield important results in new although incomplete information. If scientists will indicate a willingness to attack some of the difficult problems of management for which there is not as yet an adequate research technique, if they will utilize methods not yet perfected and perfect them by use, if they will conceive, experiment with and validate new methods, it is probable that industry will respond by offering the necessary facilities. It is true that industry also must be more imaginative and bolder than it now is, but the scientists should take the lead. In the matter of research industry cannot be expected to respond to experts who are timid and doubtful. There was no timidity about Taylor when he attacked the problem of measuring a day's work—even his brother engineers declared it could not be done. The results of this boldness have been enormous in practical results and in influence on industry's mental attitude towards scientific investigation of problems of management.

There are four methods of research which I should like to see utilized more in investigations of problems of management. One, if we may call it a method, is the reconnoissance. Men of affairs, business as well as military leaders, value exploratory investigations. More investigations of a thorough nature would find support and be undertaken were their probable value pre-determined by reconnoissances. Reconnoissance, in fact, pertains to determination and definition of the imagined problem.

The second, if we may for convenience also call this a method, is that of the clinic. The clinic is in principle much like the reconnoissance; the former is a preliminary investigation of a problem restricted in scope; the latter is a preliminary investigation of a problem extended in scope. The clinic explores a problem pertaining to an individual or a small group of individuals such as the reason for low morale and low production in a spinning room, and may lead to dependable investigation of the experimental order; the reconnoissance explores a problem of social nature, such as the reasons for labor unrest in an entire industry, and may prepare the way for an intensive quantitative investigation. It is quite possible that there could be established in an industrial plant something with the essential characteristics of the clinic of a hospital, but without the latter's formal organization and equipment. Has not every executive who mainains "a close personal contact with his workers" established an embryo clinic?

Another method is the interview, which will secure attention in the paper to follow, by Miss Van Kleeck. It is a method which has not been adequately tested, perfected and validated. It should be, for it is the best method available for discovering a certain class of important facts—those relating to mental and emotional reactions to managerial stimuli. Achievements of the interview method in psychiatry, and the similarity to or identity of its problems with many crucial problems of management,[5] justify a plea for its more serious use in management research.

The fourth method which I have in mind is the experimental method. It has been highly developed in the physical sciences and in academic psychology. The method should be utilized in industrial plants in study of problems of management. We have heretofore limited our quantitative researches pretty much to investigations of chance conduct. This throws light on what we as industrial cooperators have come to be under the influence of uncontrolled environmental forces. We should experimentally vary our managerial environment and under controlled conditions record and measure the consequences. This might throw light on what we can make ourselves come to be as industrial cooperators under the influence of controlled environmental forces. It may be that we can make ourselves masters of our managerial fates. For, while we are undoubtedly individual and group bundles of fixed habit patterns, there is apparently a section of each bundle in which the habits are plastic rather than fixed, and may be susceptible to molding influences. Many a time when some new procedure is advocated by an executive, his associates will exclaim that it cannot be done—"it is contrary to human nature." A decision to try it out proves that it can be done. Too much had been assumed concerning human nature. I feel that utilization of the experimental method in investigation of managerial problems would yield rich results.

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[5] Cf. Elton Mayo, "The Basis of Industrial Psychology," *Bulletin of the Taylor Society*, Vol. IX., No. 6, December, 1924.

VIII. How Industry May Cooperate

This paper has been addressed primarily to industrial executives. It may be that some are convinced of the necessity of promoting research in industry, may desire to meet their responsibility in the matter, and may ask in what practical ways it can be done. I shall in conclusion answer this question briefly and sufficiently for our purpose.

1. Firm histories or logs, would be an important contribution. Such records would have to be very carefully devised, and professional assistance should be utilized in devising them. In the large they would consist of statistical data and of data concerning policies, plans, programs, procedures, and so on, including reasons—the genuine reasons—for decisions. Such logs would after a period of years constitute a great reservoir of valuable information.

2. The trade associations of the various industries might well keep, to the great profit of industry, histories, or logs, of the respective industries. Whereas the firm log would emphasize internal experience of a particular firm, the trade log would emphasize experience common to all the firms of the trade, including general industrial conditions affecting the industry.

3. Many a firm might profitably establish a research unit, a functionalized individual or department within the organization, commanding the resources of scientific method and continually engaged in investigation of problems of management as they are perceived by the executives. The logs and results of firm researches should be available as a social service to investigators of repute and dependability.

4. Groups of firms may cooperate in research concerned with common problems. The research may be planned and supervised, and with respect to some problems carried on in detail, by a special organization like the well-known Retail Research Association, or it may be planned and carried on by representatives of the cooperating firms, meeting as a research group, as in the Manufacturers' Research Association of Massachusetts, about which you are to hear in detail at this meeting.

5. Managements might profitably utilize, more than they now do, the services of independent professional research organizations, such as the National Bureau of Economic Research. There are organizations of this kind which command the highest quality of research ability and render service on a high professional plane.

6. Managements should utilize and support, more than they now do, the research facilities of higher educational institutions. The research laboratories of engineering schools and of the departments of the physical sciences are now being utilized, although not to the extent to which they should be; and similar use of facilities of schools of business administration and of industrial engineering departments of engineering schools should be made. I believe a firm could not make a more profitable investment than to establish in such a school an annual fellowship of say $500, which would give it for each academic year the use of a keen young man for investigation of one of its problems under its own and outside expert research direction.

7. Finally, industry should, by financial support and at least by offering the necessary laboratory of normal managerial processes, encourage research which is carried on by students of method for the purpose of discovering and validating methods which will become the tools of research generally. With respect to this contribution of management to research, the justification of the contribution should not be the immediate and direct practical value of research results, but the ultimate, indirect practical value of discovery and validation of methods to serve industry in the development of a science of management.

The Interview as a Method of Research[1]

Its Importance as an Essential Element of the Total Procedure of an Investigation Involving Human Relations

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The Problem

THOSE of you who are accustomed to exact measurements of machinery and materials will be inclined to change the title of this paper to Conversations of a Social Scientist, with quotation marks about the word scientist. Perhaps the implications in that suggestion will clarify the problem. Conversation is a means of human intercourse. The question is how to perfect the interview as a method of social research. Social research has to do with human beings in their relationships to one another. Because human beings are the subject and the final source of information, the interview is the distinctive tool of the social sciences as contrasted with the physical sciences. All sciences, whatever their subject matter,—whether atoms or social institutions,—have in common the method of observation and in varying degrees the method of experiment. But when some phase of society or the relationship of human beings is the subject, two other methods emerge; namely, documents or records of the activities of human beings, and interviews.

The difficulty in the use of the interview is the variety of factors and circumstances which affect it. An interview involves always at least two personalities. What a man says reflects his emotions, his "state of mind," his own experiences; and what he says about social conditions or institutions is not invariably the same thing which someone else observing the same conditions would say. Moreover, the investigator who interviews him is subject to the same personal variations, and the relationship between the two personalities introduces another imponderable factor. The same person may gain different impressions at different times. This kind of variability does not beset the physical sciences. Physical science finds assurance of validity in methods which are independent of the feelings, emotions and personal limitations of the man making the observations. The fact that water is made up of two parts of hydrogen and one of oxygen can be discovered, recorded and verified without danger that the emotions of the investigator,—his preference for oxygen, perhaps,— may lead him to report that he has found water with two parts of oxygen and one of hydrogen. In their search for similar assurance, economists and sociologists have made use of statistical methods. By counting units and figuring arithmetically the relationships between them, independence of personal factors is possible. But when the subject is the relationship of individuals to each other in a group or the interactions of two groups and when a main source of information is a conversation or series of conversations, different results may be secured by different investigators, and reliability becomes difficult to measure.

If, however, the reliability of data obtained through interviews cannot be measured, and if we are thrown back solely upon quantitative methods, the essence of which is counting units, then we are forced to conclude that no subject which cannot be elucidated by counting is within the scope of scientific treatment. If we reject the possibility of perfecting the interview as a reliable method of research, we reject as subjects for research all phases of human relationships regarding which data can be obtained only by interviews. Signs are many, however, that the scientific spirit of our age refuses any such limitation. Investigators in industry and outside of it are actually seeking to apply the scientific method to a variety of phases of human relationships. Because of their activities, the possibility of perfecting the interview becomes a problem worthy of attention by all who put their faith in the methods of science as applied to human problems.

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[1] Paper presented at a meeting of the Taylor Society, New York, December 10, 1926.

The subject then resolves itself into two main questions: (a) Does the interview as a method of research enlarge the area of possible study of social phenomena, including the human aspects of industry? (b) What procedure can be set up as a means of testing the validity of interviews in a given piece of research, and what factors enter into the reliability of data thus obtained?

The Concern of Industrial Management in the Problem

Have these questions any interest for industrial management? Are there subjects of research into the principles and practice of administration and management which require the interview as a method of securing data?

At the annual meeting of the National Electric Light Association in May, 1926, Owen D. Young, speaking of the development of power resources and declaring that "public service is the goal . . . a public service which not only meets its own economic requirements but supplies our social needs," said: "You are not afraid of new inventions and new engineering in your physical plants. You are accustomed to rapid progress. May I suggest that invention, improved engineering and courage to take the road are needed now in the social more than in the physical sciences? I recommend that we take the overhead of research and experiment in the social field now when the social balance sheet is stable and not postpone them to the day when it may be too late."[2]

Weighty support for such a view of the importance of the social sciences to industry and business today is found in Dr. Person's paper at this session, on Management's Concern in Research. May I read again his classification of the range of information required as a basis for managerial decisions? As I read it, will you think whether any of these subjects is so unrelated to human beings and their reactions that no phase of it would require the methods of social science and particularly the interview to secure the necessary data? Dr. Person's classification is as follows:

a. "Materials; their fabrication and consumer uses."
b. "Progress of the arts employed in industry."
c. "Organization for and direction of transformative and distributive processes."
d. "Human individual and group reactions to organization and direction procedures and relationships."
e. "Consumer demand, and the general and particular markets."
f. "Industrial tendencies pertinent to long-run planning of policies and programs."
g. "Environmental influences such as social customs, government regulation, international relations."

The first subject, materials, would seem to be independent of human relationships. But can the industrial manager know all that he needs to know about materials if he excludes from the range of his knowledge the habits and attitudes of the men who make them, their skill, their training, their creative powers? Must he not also know the habits, the attitudes and the circumstances of purchasers? Can the market be understood without using the methods of the social sciences?

The discussion so far has assumed that research is a means of discovering facts. In the relationships of industry has not research another function, namely, to point the way out of conflicts? "The Contributions of Research to the Harmonizatiton of Opinion"[3] was the subject of an address by Professor S. A. Courtis of the University of Michigan before a group of educators a few months ago. "Research is ordinarily valued because it results in the discovery of truth," said Professor Courtis. "My thesis is that the supreme value of research lies in the power of truth to harmonize conflict of human opinion and make co-operation possible." By way of analysis of his thesis he finds "seven major types of conflict: (1) the pseudo conflict of misunderstanding; (2) the intentional conflict of dishonesty; (3) the irrational conflict of emotional bias." The remaining four he calls rational conflicts: "the conflict based upon conclusion drawn from different facts; disagreement as to what the facts are; disagreement caused by defects in the generalizing process; conflicts caused by differences in interpretation. Each has its appropriate remedy. It is our duty as rational beings, when we find ourselves in conflict with a fellow being, not to dissipate our energy in useless brainstorms, but to rationally classify the conflict as to type, attach the proper label and apply the proper remedy."

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[2] *National Electric Light Association Bulletin,* June, 1926, p. 362.

[3] *School and Society,* June 5, 1926, p. 707.

Does not this idea suggest that social research in industry may be more than a method of discovery confined to a research department, that it may be the motivating spirit and attitude of the organization?

Numerous other evidences of the interest of management in the social aspects of business could be cited, including articles in the Bulletin of the Taylor Society and in trade and engineering journals. It is a privilege to discuss the subject in this group because so many of you are now carrying on social investigation in your plants.

Scope of This Paper

The problem is so difficult that I have no hope of being able to say any final word on any phase of it. The purpose of this paper is simply to formulate the questions as they appear to an investigator who, in twenty-one years of continuous effort to get facts about human relations in industry, has never yet been able to dispense with interviews and to confine attention exclusively to data derived from records or documents or observation. What I have to say, therefore, is merely a series of notes growing out of experience. It has to do with the interview as an economist or a sociologist uses it. Engineers have also used it. All that can be accomplished in this presentation of the subject is to break up the problem into more manageable questions for inquiry, in the hope that there may be a keener consciousness of method on the part of all of us who are making studies of industrial relations, and a pooling of experience which will grow out of this renewed consciousness of method.

Contributions to the Problem

Much of the discussion of this paper grows out of the thinking of others who are substantially furthering the development of social sciences through the study of method. The Social Science Research Council, shortly after its organization in 1923, appointed a Committee on Methods of Research which is now planning an inquiry of considerable importance. The committee proposes to have an analysis made of methods used in outstanding investigations in the different branches of the social sciences. The Personnel Research Federation has had a committee on methods of research during the past year and is particularly interested in the problem of perfecting the interview. The Taylor Society has shown its interest not only in the program of this session but in other ways: the scientific method of approaching problems of management and administration, which the Society is organized to further, must by its very nature seek an application to studies of human relations. Examples of its application in the work of members of the Society, in its conferences and in its Bulletin will occur to all of you. Another group, which has contributed most perhaps to perfecting the method of the interview, is made up of the social case workers, notably Miss Mary E. Richmond, whose book, "Social Diagnosis," discusses this question. For the social case worker, the interview is part of a scheme of treatment and not a tool of research. But much of the discussion of method is applicable to either purpose

Recent books and articles in which references are made to the interview are surprisingly numerous. A bibliography published in the *Journal of Personnel Research* last July includes no less than twenty-eight titles of books and fifty-one articles and pamphlets. Most of all, we owe a debt of gratitude to investigators who in the last twenty-five years have produced noteworthy research bearing upon human relations in industry. Each of these investigations has implicit within it a contribution to make to method. The difficulty is that the investigator has often been unconscious of his method or has not reported it. The task which awaits us now is to analyze the methods actually used and to test their value.

Place of the Interview in the Procedure of Investigation

If I were to attempt to formulate a thesis as the focus of our present discussion, it would be this: the interview cannot be appraised apart from standards of procedure for an investigation as a whole. At present no accepted standard of procedure exists. As a background for discussion of the interview, may I venture to suggest what seem to me to be the indispensable elements in a valid piece of research? These are not outlined chronologically. In the actual making of an investigation, experiment is necessary and the procedure set up at the beginning must be kept flexible and modified as circumstances require. The subject selected in the beginning may have to be rephrased. Sources of information which at first seemed promising will be abandoned and new ones discovered. Questionnaires should be tried out and modified. Experimental tabulations of data may result in change in emphasis in every part of the inquiry. Nevertheless, assurance of validity of the findings must be sought in the procedure followed in the investigation, and it may be useful to analyze this procedure as follows:

a. *Definition of the subject of investigation.* That the subject must be defined would seem to be obvious. Yet a clear cut definition is often lacking in reports of social research. What should be the characteristics of the definition? I suggest that, to be appropriate for scientific inquiry, the subject must be a problem involving relationships between phenomena; it must be delimited, so that the available sources of information and the facilities for using them will cover the subject as defined; it must be concrete, not abstract,—a thing, not an idea. For example, according to this analysis, the effect of reduction of hours of work on output in Department A of Plant B is a problem for investigation; "private enterprise" is not. "What are the factors in the growth of the iron industry in the United States during the last sixty-five years?" is a manageable subject; "protection versus free trade"[4] is not.

b. *The purpose of the investigation* must be determined. If the facts are to be used as the basis of managerial decision, the scope and method of the investigation will be affected by what one might call the limiting factors in the decision of the management. If the same problem (the effects of reducing hours of work, for example) be studied by a legislative commission seeking to determine the desirability of reducing hours by legislation, the scope and method of inquiry will be different.

c. *Units of measurement or standards of evaluation* must be selected and defined. For example, if the subject be the effect of fatigue upon industrial efficiency, a method of determining the presence and extent of fatigue must be chosen; and the measurement of efficiency must be set up. Obviously, the choice of several different types of measurement or evaluation will be influenced by the original definition of the problem and by the purpose of the inquiry.

d. *Relationships* must be established with groups and individuals involved in the situation studied. The establishment of these relationships is unique in the social sciences. It has far reaching effects upon the validity of the data obtained.

e. *Sources of information* must be analyzed and decisions reached as to the methods of utilizing them. Decision must also be made as to the size of sample for study within the variously defined groups of units. The importance of the interview will vary according to the abundance of other sources of information. For example, a plant thoroughly equipped with operating records will have data available which in a plant with less adequate operating records could only be obtained by interviews. In the present stage of inadequate development of records of industrial activities the interview is distinctly overworked. It may become a fine and necessary instrument for certain types of inquiry. When used as a substitute for another tool, which happens not to be available at the moment, it becomes a makeshift.

f. *Methods of procedure* (experiment, observation, interviews, statistical calculation, analysis of records) must next be studied and a working plan drawn up as to the kind of data to be expected from each of these sources and the methods which are suggested by these purposes. This analysis of methods of procedure will include the preparation of schedules, outlines of interviews and all the other working plans of the investigation. It should be emphasized, again, that final decision on methods cannot usually be reached at a particular stage of an investigation, but must be subject to modification through experiment and through changing circumstances.

g. *The process of study of the findings* is research in the true sense of the word. It is during this stage that illumination comes to the mind of the investigator and explanations of relationships emerge. Time does not permit any attempt to discuss this process. Many investigations never reach this stage. They continue to be unilluminated masses of facts awaiting adequate interpretation.

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[4] Illustration from "Quantitative Analysis and the Evolution of Economic Science," *American Economic Review*, September, 1926.

h. *Verification* is the next stage, when, in the light of possible explanations of relationships, the original data are again subject to review.

i. *The preparation of the final report,* which is at present so unstandardized, may be reducible to certain principles of procedure. But all that can be said about it at the present time is that standards for this phase of social research will become possible only after the previous steps in procedure are more clearly agreed upon than at present.

Factors in the Reliability of the Interview

The preceding outline of the indispensable elements in a valid piece of social research is, of course, open to difference of opinion. Other investigators might express it differently and give a different emphasis to the various elements. It is set up here by way of suggesting that the reliability of interviews depends fundamentally upon the quality of the investigation as a whole. Moreover, the place of the interview in an inquiry and its relative importance will vary widely in different pieces of investigation. In some, it will be the main source of information; in others, it will be merely a supplementary guide to interpretation of quantitative measurements. Assuming a procedure in the investigation as a whole which is objective and which conforms to the best standards of experience, tests of reliability of the interview itself may be outlined as follows. In passing, it should be noted that the subject of group interviews deserves full analysis, but on the whole the factors in reliability are the same.

a. *The purpose of the interview* affects the procedure in conducting it and the subsequent tests of its validity. As an instrument of research the interview takes many different forms, according to the difference in purpose. Some examples of different purposes are: (1) to win cooperation and to establish relationships with those involved in the situation studied; (2) to get advice and opinions which will assist in defining the problem; (3) to determine sources of information; (4) to explain documents or other data; (5) to verify an interpretation. These, in a sense, all have to do with supplementing information already at hand or facilitating other procedures. In connection with them the person interviewed is not a primary focus of interest, and the interview for these purposes may be regarded as an incidental tool. It becomes the main instrument when its purpose is to get the basic facts called for by the definition of the problem of investigation. When this is its use, the individual interviewed may be either a source of information or a subject of study. If, for instance, the investigator seeks data on the mobility of labor in a community and measures it by the number and variety of positions held by a selected group of workers in a given period of time, each person interviewed becomes a source of information on the subject of inquiry, and the information which he gives must be checked for accuracy by reference to payrolls and other records. If, on the other hand, one is studying the interests, the qualifications and the activities of employees' representatives, one may gain through an interview significant information about the employees' representative. The employees' representative may be inaccurate in his statement of facts; but if the purpose be study of the individual, his inaccuracy is in itself a fact. The purpose of the interview, however, must determine the use made of the material gathered. The inaccurate employees' representative may need to be eliminated from the study if the purpose of the interview is to get the facts about a situation on which he is supposed to have accurate information.. But it would not do to discard him if the purpose is to test the caliber of employees' representatives as participants in a scheme of industrial relations. Finally, it should be remembered that many quantitative studies derive their data in the first instance from interviews. The United States census of population is based on information secured in interviews of enumerators with representatives of families and households.

b. *The choice of persons to be interviewed* is a check upon reliability. The choice must, of course, be related to the definition of the problem for investigation. It must also be related to the definition of units of measurement or standards of evaluation within the study.

c. *The competence of the person interviewed* is a closely related factor. An interview cannot be called reliable for the purpose of securing information if the information desired is wholly outside the range of experience of the person interviewed. When the purpose of the interview is clear, the next step is for the investigator to discover what contribution the person interviewed has to make to that purpose.

d. *The method of conducting interviews,* including the circumstances, the place, the approach and the use of questions, is in itself a large subject which cannot be elaborated here. It is on this point that social case workers have made their largest contribution. The psychologists, too, have much to contribute on the technique of study of individuals. The interview will be weak if the method of conducting it is not skillful in relation to its purpose, no matter how coherent and precise the procedure as a whole may have been. Something is to be learned, too, from rules of evidence in legal procedure, and particularly from the methods of medical diagnosis, which have their analogy in social research.

e. *The method of recording interviews* has an important bearing on the subsequent use of the data. Frequently it is inadvisable to take notes in the course of an interview, because this checks freedom in conversation. Under some circumstances, however, it increases the sense of responsibility of the person interviewed if certain major facts, at least, are written down. In any event, a complete record should be made immediately after the interview, and it should give evidence of the course of the conversation and its circumstances,—in other words, the whole method of conducting it and the competence of the person interviewed. The impressions or opinions of the investigator should be separately recorded. These are important, but they should not be confused with the statements made in the interview. Often a statement which seems to have little significance at the time when the conversation takes place may assume vital importance as the investigation proceeds. The investigator therefore should be concerned with making a record of all that he can remember of a conversation, rather than selecting the data which seem to him at the time to be essential.

f. *Procedure for verification* may constantly accompany the interview. Questions will be raised which may be verified by interviews with others or by reference to documents. Again, the purpose of the interview will determine the type of verification required. Sometimes it may be necessary to interview the person again under different circumstances or even to have him interviewed again by another investigator. This will be true when the individual himself is the focus of interest. If, on the other hand, he be primarily a source of information, then the statements which he makes may be checked by the statements of others having knowledge of the facts or by documents of various kinds. The whole question of size of sample and choice of persons to be interviewed is intimately tied up with the procedure for verification.

g. *The relationship of data gathered by interviews to data gathered by other sources* is another test of the interview. If there be serious discrepancies between statistical calculations based on payrolls or records of activities, in minutes or other documents, then it may be necessary to seek an explanation by re-examination of the data. It may be said that seldom is the interview the sole source of information. Observation usually accompanies it and often records will reinforce it and check its reliability.

h. Finally, underlying all these factors, is *the investigator himself,* his equipment, his experience and his point of view in relation to the particular subject of investigation. We cannot eliminate the personality of the investigator in any scientific procedure. Even in the physical sciences absolute objectivity is not obtainable. Another scientist might have gone through the same motions as Pasteur, worked on the same problem and used the same laboratory equipment, without making Pasteur's discoveries. Great discoveries have always been the creative act of the individual, and this must be true in the social sciences. The safeguard against the bias or the personal idiosyncrasies of the investigator must lie in an increasing consciousness of method on the part of all investigators; a careful record of method in the report of every study; training in logic and in scientific procedure on subjects other than social relations; and a devotion to truth which far outweighs any desire to prove a point or to institute a reform.

These factors all enter into the period of fact gathering, which is only the first stage of research. In the next stage, when the investigator studies the data to discover relationships and explanations, the results of interviews are again subjected to tests of reliability. Contradictions become clear and demand re-examination. At the stage of verification, when in the light of possible explanations of relationships the original data are reviewed, the reliability of interviews must also be objectively tested.

Next Steps in Improving Methods

Each point in the foregoing outline of factors in reliability demands extensive analysis and experiment. The outline is given here merely to indicate a framework within which it should be possible to study the whole problem of the interview as a tool of research. Perhaps the immediate need which is most practical is to make analyses of investigations already reported having a variety of purposes and methods. Out of such an analysis should emerge common elements, if there be any, or reasons for differences. Similarly, if investigators who are now at work on special studies will record in their reports a much fuller account of their methods than usually appears in print, it will serve the same purpose of accumulating actual experience and making investigators conscious of method.

Cooperation between the different branches of scientific work will be fruitful, because comparisons of work done from different points of view and on different phases of human relations will illuminate underlying principles of method and procedure. The psychologist and the anthropologist both have experience which would be very useful to the economist, the sociologist or the engineer. The historian has long experience in handling and verifying documents. The physical sciences have accumulated experience on definitions of problems, the logical procedure in drawing conclusions and the process of discovery. In the application of science to industrial relations we need to select problems upon which representatives of several sciences may work together, thus stimulating each one of the group to more precision in method.

What Standards of Value Is It Fair to Apply to Social Research?

The test of use by other investigators and by those who are concerned in some way with action on the subject is the final sifting process which discloses the validity of a piece of research. Mrs. Sidney Webb, describing the methods of social investigation, quotes George Henry Lewes' definition of truth as "the correspondence between the order of ideas and the order of phenomena, so that the one is the reflection of the other, the movement of thought following the movement of things." If finality be the test, few if any pieces of scientific work can be said to have possessed it. Witness the rapid changes in chemistry and in physics. After all, who knows enough to apply the test of finality? But if correspondence between the movement of thought and the movement of things be the test, it is not unreasonable to expect to achieve it in a relative and changing sense in studies of human relationships. As in all science, the most that can be desired for any single study is that it should be worthy of integration into thinking, so that the investigators who follow may make their own beginnings at a point a little closer to reality.

IF KANT'S famous definition of philosophy may be paraphrased, a critique of method must involve the three questions: What can the method reveal? What needs to be revealed? How may what is revealed be utilized? And the criteria of method are the same criteria of the scientist and the philosopher. In each case the conclusions must run the gamut of the same rigorous tests. Does the conclusion (the method) exclude other conclusions? Is it a consistent conclusion? Does it apply equally to the whole and to the parts? Is objective evidence available? If not, what is the validity of the subjective evidence? Will the conclusion be substantiated by the "consensus of the competent"? Is a consensus of the competent possible? Does the conclusion close the door upon experimentation? In view of these tests and criteria, . . . all methods must be regarded as relative and none as ultimate . . . Until a more adequate method of discovery is devised, it will be the part of wisdom to leave both the method and the content of the social sciences in a state of "experimental solution." (Eduard C. Lindeman, "Social Discovery," p. 31.)

The Manufacturers' Research Association[1]

An Organization of Massachusetts Manufacturing Plants Which Enjoys the Benefits of Joint Investigation of Common Managerial Problems

By R. L. TWEEDY, Director

THE MANUFACTURERS' Research Association—commonly referred to among its members as the M. R. A.—is a group of eleven companies and a large educational institution—twelve factories, if a unversity may be called a wit polishing factory. No two members manufacture competing products. It was organized just five years ago this fall. The membership comprises a machine tool builder, a paper manufacturer, a publishing house, a chain of cotton mills located both in the North and in the South, a paper specialty house, a tanner of sheep and goat skins, two manufacturers of textile machinery, a rubber manufacturer and a university. The value of the combined products turned out yearly amounts to at least $150,000,000. Of course, this figure does not include the university, whose product I would not presume to evaluate.

The foregoing statement enumerates the physical properties of the M. R. A. It is the sort of statement a banker would demand. Physical statements have a way of leaving out factors which are of the utmost possible importance but extremely difficult to evaluate in terms of dollars and cents. To leave in your minds an impression such as you might get from the foregoing statement of the Association's visible assets would be equivalent to falsifying a tax return. The really significant feature of the M. R. A. is the unusual coterie of men that organized it and has stood solidly behind it ever since it started. The unusual thing about the group is that it includes a number of men who have made outstanding contributions to the science of management. Whatever may be said about the founders, they are not collectors of antique business systems. Nor are they men who willingly walk along crooked thoroughfares which began like the calf-path described so well by Sam Walter Foss. On the contrary, they are men of courage and vision: courage to tackle the things that can't be done and do them. They have a social conscience and realize that for a considerable element in the community business is life. Furthermore, no confusion exists in their minds as to which of these two things is a means and which is an end.

In order to promote intimacy between the members, and familiarity with each other's problems, the membership is limited by the constitution to twelve. To make it practical for persons connected with these companies to take part frequently in Association activities, the policy has been to restrict the membership to companies located in Eastern Massachusetts and Rhode Island.

Purpose

The Association was organized for the purpose of pooling business information and experience in all the factories, in the belief that the formation of such a pool would make it possible to render mutual assistance in solving problems common to two or more members. Besides enabling one member to profit by another's accomplishment, the aim is to effect savings through the avoidance of duplicating costly experiments and investigations which have become matters of record. Other objects of association are: to promote greater excellence in the science of management and to permit progress in this science to become more rapid and widespread and at the same time less costly.

Will Durant says: "Every science begins as philosophy and ends as art; it arises in hypothesis and flows into achievement. Philosophy is a hypothetical interpretation of the unknown, or of the inexactly known; it is the front trench in the siege of truth. Science is the captured territory; and behind it are those secure regions in which knowledge and art build our imperfect and marvelous world."

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[1] Paper presented before the Taylor Society, New York, December 10, 1926.

When the M. R. A. began it was an experiment pure and simple. It started as a philosophical premise. Briefly, here it is:

Few successful men and women represent an all-round development. Most people have made reputations for outstanding accomplishment in a particular field. The same thing is true of manufacturing organizations. To illustrate: Factory A has developed striking excellence in the field of material control; B is very far sighted when it comes to selling and distributing its product; C has shown unusual ability in the handling of industrial relations problems and in building up a living organization; D excels in office routine and accounting methods. In the same company it is not unusual to find one or two departments well organized while other departments are noticeably backward — a lop sided development, in other words. It was thought that an analysis of the things each company had done more effectively than others in the combination would reveal the principles responsible for conspicuous achievements, and that this would make it possible at once to apply these same principles to other lines of industry. This *was* the theory. After five years, it has become an accepted fact. When each company in such a group patterns its methods after methods which have demonstrated their superiority, and brings its practice up to the standard of excellence represented by the highest achievement, the highest achievement thereby becomes the average.

On account of the diversity of industries, it is seldom practical to attempt to solve a problem in Company A by means of a solution which has proven effective in Company B *without* such adaptation as will provide for inherent differences in the nature of the two businesses. Instead of presenting an obstacle we believe that the differences in technique and tradition represented in the membership constitute one of the greatest elements of strength which the M. R. A. possesses. Mary Follett illustrates this point admirably when she says, "Difference is here in the world," and I add "to stay." "As we cannot avoid it, we should, I think, use it instead of condemning it . . . . . set it to work for us. Our opponents are our co-creators, for they have something to give which we have not. The basis of all cooperative activity is integrated diversity." The German philosopher Fichte put it in another way and said, "Thesis, antithesis and synthesis constitute the formula and secret of all development and all reality."

Trade associations are composed of independent business concerns, but all engage in the same kind of industry. This makes direct comparison possible as between situations in any two or more given companies because they are essentially alike. In the case of the M. R. A. it is rarely profitable to compare productive processes. Upon first thought, the natural reaction is to ask, "What is left?" But business is both a science and an art. Like astronomy, chemistry or any other science, business today represents a vast amount of classified knowledge which can be taught and practiced as an art. It is upon this theory that all our business schools build. The principles underlying all manufacturing businesses are the same. It seems unnecessary to treat as an assumption a fact which has been so conclusively demonstrated. All manufacturing industries buy raw materials, machinery and labor; they convert raw materials into finished products; they all have administrative problems; practically all sell and distribute their product; they all figure costs and keep accounts. As a matter of fact, regardless of the product, most factories purchase many materials in common; e.g., fuel, lubricating oils, belting, paint, lumber, packing material, printing, electric lamps and many other items. The M. R. A. purchasing agents held a meeting every two weeks for a year and a half for the purpose of discussing a four page typewritten list of commodities which they bought in common. Please remember we are considering a group of diversified industries. Latterly, meetings of this committee have been held monthly. During one winter eight meetings were given over to a course of lectures on the significance of the various factors which taken together determine the market. These lectures were delivered by two professors from the department of economics in our university member. A fat text book was used and men in middle life reverted to class room methods.

The handling and control of raw material concerns stores keepers. The items stored need not necessarily be the same. Control of finished stocks and inventories, packing, shipping, motor truck operation involve another group of executives. Grounds, buildings, maintenance, power, light, heat, ventilation, drainage, internal transportation of materials in process are things plant engineers think a lot about. Safety and accident prevention are much the same everywhere. Industrial relations programs involving the maintenance of the labor force—selection, employment, placement, follow-up, promotion, transfers, training, wage payment, retirement, recognition of length of service—are things that concern every personnel executive. Works managers deal with shop organization problems, quality standards, output, production cost and common problems too numerous to mention. One could make a tiresome list of things that are done in every well regulated office. Heads of sales and advertising departments have much in common whatever the product.

Methods

Now . . . . how does it work? First of all, the director does not function as an expert in any field. The chief duty of the director is to see that there is a constant flow of information and knowledge from the membership into the pool and out again, which eventually becomes translated into action. The assistance each company derives from the Association comes directly from the other companies in the group.

In part, this transfer is effected through committees made up of persons performing like functions in the separate organizations. As a usual thing, about ten committees are active at any given time. Committees fall rather naturally into two groups—continuous committees such as Works Managers, Plant Engineers, Purchasing Agents, General Sales Managers. They meet every month to keep posted on matters pertaining to their own fields. It is customary for each of them to lay out a program covering the work of a season in advance. This makes it possible to engage speakers ahead of time and it also makes it fairly certain that each meeting will contribute toward the accomplishment of a definite result.

Almost all committee meetings are held in club rooms of the Boston Chamber of Commerce. They generally start around the noon hour and are usually preceded by a luncheon. Some of them, however, are staged at the plants of members, especially if it is desirable to exhibit some equipment or process in connection with the meeting. Several metings have been held at the Massachusetts Institute of Technology, which afforded facilities for demonstrating special apparatus. In one instance, the members of the Executive Board, accompanied by some of their staffs, went in a special car to the central part of this state where they visited a factory which enjoys the reputation of being a pioneer in certain fields.

A committee composed largely of treasurers, vice-presidents and statisticians has been studying for more than a year how to iron out the humps and hollows in the business cycle for the purpose of discovering ways and means of regularizing industry and stabilizing employment. It is called the Committee on the Regularization of Industry.

The aim of commercial indices is to furnish an instrument which will bend light rays, so to speak, in such a manner as to enable observers to see a little further around the next bend in the river. For the past eight months, this committee has been experimenting with what it believes to be an improved tool. This has been called the M. R. A. Demand Index. It is an index built up solely on the basis of receipt of orders in each M. R. A. Company. It leaves out of account such factors as volume of production, rate of shipment and other factors which lag behind receipt of orders by intervals varying anywhere from one day to six months. While this index is still in its infancy, it has been carried on long enough to show that the resulting curve not only moves in essentially the same direction as curves which include the lagging factors, but it precedes their movement by a period varying from several weeks to several months.

A statement of the manner in which the Works Managers' Committee has been operating this past year will show still another method of approach.

Each month on the calendar was assigned for the inspection of a given plant. During this month a day was assigned to each works manager when, accompanied by as many of the members of his staff as he cared to take with him, he visited the plant for the purpose of making a critical inspection. Anything found in the plant which he would not tolerate in his own plant—disorder, poor housekeeping, accident and fire hazards, inefficient practices or equipment, conspicuous waste, low morale or what not—he made note of and included in a report to the director of the Association. At the end of the month, reports of all works managers on this plant were summarized and a copy sent to each works manager. A period of two months was allowed the works manager whose plant had been visited in which to investigate criticisms and formulate a reply. He was expected either to defend existing conditions or to accept the criticism and state what action had been instituted to rectify the situation. The reply of the works manager under fire was distributed among members of the committee several days in advance of the regular monthly meeting at which it was scheduled to be discussed. This practice acquainted each man with the reaction his criticisms had met and permitted him opportunity to debate the point further in open meeting if he cared to do so.

It is significant that the criticisms of visiting works managers focussed quite consistently upon the same things in any given plant. The fact that each works manager made his inspection on a separate day and independently of every other works manager, thus allowing no chance for one manager to know what points another had picked out to censure, lent additional weight to any consensus of opinion. In the face of such united opinion one of two things was pretty sure to happen; either the shortcoming was rectified or the responsible works manager carefully reviewed his reasons for continuing the questionable practice. The criticisms covered a wide range—in one plant 167 items, and over 100 in almost every one. The manager of one plant accepted and took steps to act upon thirty eight per cent of the things his confreres had found to criticize in his plant before he appeared in meeting. Others adopted a percentage nearly as large and many are planning to act upon criticisms at the earliest possible moment.

Doesn't such reception of criticism that often hits sore spots give some indication of the mutual confidence and respect existing between the members of this group? Without the underlying motive of mutual aid and the conviction on the part of everyone that criticisms were based on a sympathetic understanding of each other's problems, despite the constructive nature of the criticisms, a program such as the one outlined would have been doomed to failure before it started. As it was everyone entered into the plan, heart and soul, believing that it offered an unusual opportunity for each manager to draw upon friendly experts for advice. Through the entire program not a word of resentment was heard.

So much for continuous committees. The special committees are organized to investigate a particular subject or situation. As the usual thing not more than four or five companies are represented on any one special committee. Special committees meet frequently—sometimes weekly or fortnightly—until they have organized their findings in the form of a report to the Executive Board. Some of the subjects which special committees have investigated are:

Wage Payment Methods[3]
Rush Orders
First Weeks of a New Employee
Internal Transportation
Motor Truck Operation
Promotion and Employees' Progress Records
Foremen Improvement
Compensation Insurance

The policy of keeping the number of people working on these special committees small is followed because only people are wanted on committees who have done actual work on the problem in hand, and are qualified to report experience.

All committees receive their instructions from and report to the Executive Board. On the Executive Board each company is represented by one man—usually the president of the company or someone appointed by the president to represent his company. It meets five times a year.

From its membership it elects as officers of the Association a president, vice-president and secretary-treasurer. It appoints a director; determines the policy of the Association; admits companies to membership; fixes yearly dues; adopts a budget; decides what subjects shall be investigated, receives reports from working committees and is the medium through which measures advocated by the Association are translated into action in the individual companies. It is not primarily a working group.

Between the Executive Board and the working committee is a small committee known as the Steering Committee. This committee is composed of four members—one man from each of three companies, and the director ex-officio. It elects its own chairman, meets monthly, except during the summer. Its duties are:

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[3] This report has been published in pamphlet form by the Boston Chamber of Commerce and can be secured from them.

1. To plan Association activities in such a way as will accomplish the results desired by the executive board.
2. To assist working committees in planning their programs.
3. To follow the progress of each committee's activities so as to be in a position to recommend changes which will speed up progress and enhance the value of results.
4. To make recommendations to the executive board pertaining to the actual operation of the Association and the translation of committee findings into action within member companies.

In addition to the service performed by committees, experience and information are pooled through contacts established between individuals. One of the privileges offered by the Association is free access to the plants of other members. This courtesy is highly valued and there is an almost continuous exchange of visits between minor executives, foremen and others in search of special information. Of course, plant visits are by no means peculiar to the M. R. A. Every company worth its salt does a certain amount of entertaining and gives out more or less information to interested parties. The difference between such exchange and that provided by the M. R. A. is purely one of degree and quality. I shall come back to this subject presently.

The office of the Association is located in the Chamber of Commerce building in Boston and serves as a clearing house for all sorts and kinds of information for which one or another of our members happens to be looking.

A news sheet serves the purpose of a monthly letter calling the attention of members to innovations and improvements in method and equipment which have been tried out and approved. Happenings in any company likely to have interest for other members are inserted. It contains also notes on the work of the various committees. This enables persons actively engaged in one group to know what is going on in other sections and so keep in closer touch with the work and aims of the Association as a whole. Space is reserved for questions which one company or another may want to ask. A tentative calendar covering Association events for the coming month is inserted.

One form of mutual aid in which the Association has great confidence is the practice of loaning staff executives. To illustrate what I mean: suppose that a certain company has a job to perform that is out of its usual run of work—something that occurs so infrequently that it would not pay to employ regularly a man thoroughly familiar with best present day practice. An actual case occurred within the last few weeks. Company A was making a complete rearrangement of several departments, in order to restore a proper sequence of operations. There was a lot of heavy machinery to be moved from one building to another. The company could have muddled through the job and effected the move somehow, no doubt. But instead of attempting something in which it lacked experience, it turned to the M. R. A. Now, it happens that factory B is a builder of heavy machine tools. To move heavy machinery is part of B's regular job. He knows all the best methods of doing this work. An arrangement was effected through the office of the Association whereby B loaned its chief engineer to A for a few days—long enough to enable this engineer to make a survey of A's contemplated move, plan and layout the work and advise as to proper equipment. Possessed of this information, A's works manager could handle the situation. It wasn't necessary for B's engineer actually to supervise the job. B charged A for the actual time his engineer was away from his home base plus traveling expense. A got the advice of one of the best engineers in New England. Compare what A actually paid B for this service with what he would have had to pay an outside, consulting engineering service! But A wasn't the only gainer. B gained also. He didn't actually need his engineer for the few days he was away and he was paid for his time. But more important still, the engineer came back to B with the added experience gained from solving another problem. Moreover, A is going to do the same thing for B or any other M. R. A. member at the first opportunity.

Only a few weeks before the above occurrence happened Company C, which over a period of years had been operating a large part of its plant on task and bonus, decided to change certain departments over to straight piece work. C had but one time study clerk available for this work. This man had learned his job in C's factory and had had no outside experience for this reason. Before making the move, the management felt that it was advisable to re-check a number of the time studies upon which it expected to establish its piece rates, not only for the purpose of auditing the work of its time study clerk, but to assure itself that its methods of doing the work were reasonably sound. (The operations involved here were quite simple hand operations.) C requested the director to negotiate the loan of a time study man from another factory which had a similar operation to perform. The management in C felt that a time study clerk accustomed to timing similar operations in another plant would contribute a fresh point of view and be able to detect motions that were flagrantly false. D loaned C the time study man, who went to C's plant and remained there several weeks. The results of this transaction were highly gratifying to both parties.

Results

Well, what has the M. R. A. accomplished? It isn't possible in all cases to draw a clear line of demarcation between the operation of the M. R. A. and results it has achieved. In some instances, they are one and the same thing. On the other hand, some results can be expressed in terms of dollars and cents savings. For example: within six months after the committee which investigated internal transportation made its report, each of two companies stated that it had figures to show that it would save $35,000 a year. Again: a company which had appropriated $15,000 for new air compressor equipment, in the belief that its old equipment was obsolete and inadequate, found that, by operating this equipment in accordance with a method described at a meeting of plant engineers, it was entirely adequate to meet all requirements. The appropriation was thus saved by the company. Also, in connection with air compressors, another company was enabled to increase the efficiency of its equipment so greatly that, without attempting to translate the saving into dollars and cents, it estimated a large amount was involved. Numerous large savings are constantly resulting from information exchanged among the members of the purchasing agents' group. Notable instances have occurred in connection with fuel, lumber, lubricants, iron and other commodities. One company effected large savings by adopting a scheme of painting its plant in accordance with a plan worked out by another M. R. A. Company. Under this plan, all painted surfaces both inside and outside the plant were measured, classified and listed. The frequency with which each part of the plant would require painting was determined. Estimates of comparative cost as between painting unobstructed walls and ceilings, on the one hand, and surfaces broken and more or less inaccessible on the other, were made. A definite painting program was adopted which covered painting every part of the plant at least one every seven years and some parts at much shorter intervals. This made it possible to employ a regular painting crew composed of the least possible number of men who could complete the program on schedule time. Another company learned how to eliminate completely explosions in its enameling ovens. In the case of most of the above items, and in many more like them, it is possible to estimate their value quite accurately. No attempt has been made to estimate the savings which have resulted from the works managers' criticisms of each other's plants. They are conceded on all hands to be large. It would be only time consuming to attempt to enumerate improvements that have grown out of the series of plant inspections carried on by this committee.

On the other hand, the Association offers many services which, though they do not lend themselves to a dollars and cents unit of measure, are regarded by our membership as having far greater intrinsic value than some of the measurable results. What the M. R. A. really offers its members is a consulting service which enables them to be guided by the composite abilities of the ablest executives in every activity existing within the group. A little while ago I said that the difference between seeking information promiscuously from unrelated companies and from companies within a group such as the M. R. A. was a difference of degree and quality. In the first case, the thing done is to give out as little information as possible in order to satisfy the interrogator. In the other, the aim is to give just as *much* information as possible because of the community of interest and mutual confidence which has grown up within the group. Perhaps the point I want to make may be best illustrated by repeating a remark which was blurted out by a high official in one of our companies at a meeting of the Executive Board about a year or so after the Association was started. It represents the changed point of view which had come over this executive in consequence of his working along Association methods. What was said ran about like this: "If any of you fellows had come to the X Y Z plant a year ago and asked us what we were doing about this thing or that, we would have told you something and made a pretense of being polite to you. But we wouldn't have told you the tenth part of what we are ready to tell you today."

One of our purchasing agents who happened to be attending a meeting of a larger group of purchasing agents inadvertently asked the man sitting next to him a question not usually raised among purchasing agents. "None of your business" was the quick retort that greeted him. Perhaps you think this man didn't take the trouble at the next meeting of M. R. A. purchasing agents to express his satisfaction at belonging to a group pervaded by mutual confidence and where one's motives are not questioned.

The potentialities of a group like the M. R. A. are almost unlimited. In the five years the Association has been operating we feel that we have exploited only the veins of ore lying almost on the surface. The rich deposits from which the largest returns will come are still intact.

A problem which has been ever with us is the development of an M. R. A. Technique—one which would fulfill the needs and requirements of a project such as the one I have outlined. While we are by no means ready to say that we have arrived, we believe that we *are* justified in feeling that we are "on the way."

The National Industrial Conference Board in its book "A Report on Trade Associations" says:

> "Fruitful and practical ideas, as distinct from philosophical speculations and literary fancies are not generally conceived in the cloistered recesses of recluse minds. They are the product of suggestion, correction, addition, adaptation, and revision. They are like the steel which constitutes one of the basic materials of modern economic life—never found in the ultimately serviceable form, but produced only after varied elements have been fused, refined, mixed, tempered and moulded. Cooperative effort provides the most promising basis for effective research undertakings."

Discussion

W. V. Bingham.[5] One particular statement in Dr. Person's thought clarifying paper calls for careful scrutiny. "In the present state of the science and the art of quantitative measurement," he states, "generally only those phenomena of conduct are quantitatively measurable which represent mass or group habits."

This generalization, particularly applicable to economic research, is, fortunately, not so pertinent to psychological measurements. The outstanding contribution of experimental psychology has been the light it has thrown on individual differences rather than on mass reactions. In almost any large workshop or office or schoolroom it would be safe to wager that the best quarter of the workers can do from two to five times as much in a given time as the poorest quarter, or do it two to five times as well. And these wide differences between people hold for their interests and emotional reactions, as well as for their intelligence, their motor control or their ability to learn new duties. Industry must measure individual reactions and deal with each executive or employee as an individual.

Then, too, it should be remembered that some of the behavior which is of so much concern to industry and which is often thought of as mass or group behavior, is after all made up of individual reactions—reactions which can be measured, and which can be greatly changed through training, through altered physical conditions or through appropriate appeals to the individuals constituting the group.

What is "good will"? It sometimes bulks large in the assets of a business. Good will has been measured. One way of measuring it is to tabulate the reactions of a sufficiently large sampling of the individuals who make up the group in question. The stimuli presented to them must be pertinent, real, uniform. About four years ago a public service corporation operating in a western community wanted the facts about the good will of its customers in the several districts it serves. To make these measurements it engaged a team of young economists and psychologists connected with the Bureau of Management Research in San Francisco. They prepared a battery of carefully considered specific questions to ask the customers about the service they were receiving—questions about the promptness with which emergency repairs were made, the accuracy with which their bills were made out, the courtesy of the corporation's representatives in handling complaints, and the like. Interviewers were then specially trained to ask these questions in a way to draw out the facts. Formulae for assigning the proper weighting to the different responses were worked out and eventually the corporation was supplied with an index of good will for each of the districts in which it operates. Within a year an election was held at which the question of public ownership was up. The proportions of votes for public ownership in the several districts were in inverse ratio to the indices of good will!

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[5] Director, Personnel Research Federation.

Measurements of loyalty, cooperation and initiative of employees, if made in an equally specific way, should yield data of value to management in setting up specific aims in the training and supervising of the workers whose reactions are recorded. Such measurements, to be reliable, demand precisely the sort of attention to the technique of the interview on which Miss Van Kleeck has so emphatically insisted.

F. P. Foisie.[4] Appreciation, rather than discussion, of the three papers just presented is all that I have to offer, and perhaps some illustrative material. Dr. Person's and Miss Van Kleeck's papers are thorough in their statement and close in their reasoning; and fixed by Mr. Tweedy's narrative of his association's research experience.

Perfecting the interview would seem to be in a fair way towards accomplishment. Perfecting the interview*er* is a subject I should like to see developed at another meeting of the Taylor Society. It was touched upon in Miss Van Kleeck's paper. For example, no matter how perfectly developed the method of interview, only the discerning interviewer could have brought to light what a friend actually did reveal in a recent interview with a nationally known industrialist. The man interviewed is alleged to be bitterly anti-union and upon this occasion gave five reasons for his position. The interviewer perceived that all five were objectionable to a large body of employers but that none of them was inherent in trade union philosophy. He therefore asked, "If these are your only objections, and if they can be shown to be incidental to your experience with trade unions and not a necessary part of trade union organization, are you then fundamentally, or only incidentally, opposed to trade unions?" After a long moment of consideration the reply came, "When it is put in that light, and you are the first person who has given me this view, I am obliged to admit that my objections are only incidental."

An interviewer in the field of industrial relations, if he is to be perfected, must first understand the play of human motives. And surely he needs to know the effect of competition on management habits and character; the fears it generates, and so forth. Yet has anyone a ready-made technique for perfecting the interviewer?

C. S. Yoakum.[5] The three papers before us represent the thoughtful and reflective attitude toward management. It is because of such papers that we may begin to speak of a science of management. Unfortunately few samples are presented in these papers, or perhaps fortunately, since we should be forced to think of our own illustrations. It would be easier to follow such papers, however, if more concrete illustrations were presented. It is not difficult, for example, to give a simple illustration of how an interview can be checked; of how consensus of opinion is obtained. It is more difficult to present an investigation that demonstrates how we begin with a felt difficulty and proceed step by step to factually established conclusions. Precisely because of this difficulty it seems important that a session of the Taylor Society should undertake such a program.

One of the outstanding features of the first two papers is their reference to pure science. Logic, sociology, psychology, economics, etc. are mentioned freely. Will management find itself dependent on such sciences, or is it to be the beginning of an independent field? Early phases of management drew men trained in the natural sciences. The art of management was forced upon men who had drawn their inspiration from physics, chemistry and mechanics. Do these fields really offer facts and methods that are applicable to a science or art of management? It is interesting to see these discussions reaching out into totally different fields for method, for data and for principles.

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[4] Industrial Relations Manager, Seattle Waterfront Employers' Association, Seattle, Washington.

[5] Professor of Personnel Management, University of Michigan, Ann Arbor, Michigan.

Perhaps we are reaching a stage in the evolution of science when there can be described such a thing as General Method; when the difficulties we encounter in business and elsewhere will not resolve themselves under the influence of some one narrow field. Is management that catalyst which will force us to disregard the existing boundaries of science and to explore many and diverse sciences for its data? From the excellent papers before us the conclusion seems to be in the affirmative. Management demands the exploration of all fields, not only those which inform us about materials but also those which consider the various relations between men.

Some News of Local Sections

Southern Tier Section Meeting

The New York Southern Tier Section held a dinner meeting at the Hotel Rathbun in Elmira, December 13. Mr. F. C. Hobler, Secretary and Treasurer of the Willys-Morrow Company, gave an able talk on "Budgeting."

Central New York Section Meeting

The Central New York Section held its annual business meeting in Syracuse, November 5. Mr. Harry D. Anderson, Resident Manager of the Scovill Wellington Co., spoke on Burden Distribution and Application."

Election of officers resulted as follows: Chairman, Robert Julius Andersen, Industrial Engineer and Production Manager of the Bowen Products Corporation; Vice-President, C. L. Nicholson 2nd, Production Manager of Pass and Seymour; Secretary and Treasurer, E. F. Papworth, Comptroller, Brown-Lipe-Chapin Division, General Motors. The new executive committee is J. L. Lonergan, Will H. Smith, W. C. Rodger and Donald A. Laird.

New York Metropolitan Section

One of the outstanding meetings of this active section was that held at the Town Hall Club, November 18, when Mr. Wallace Clark, Consulting Engineer, was the main speaker. Mr. Clark was a member of the American Finance Commission, to Poland, headed by Prof. E. W. Kemmerer, and so had much of special interest to bring to his subject "American Management Methods Applied to Foreign Government Industries." Guests from a number of European countries attended.

The Eastern Massachusetts Section met in Boston on November 19 to hear Mr. Johnson O'Connor of the General Electric Company on "Measures of Natural Abilities." Central Ohio and the Japanese Branch have also held recent meetings.

Reviews

The Growth of American Trade Unions, 1880-1923. By Leo Wolman of the Staff of the National Bureau of Economic Research, with a foreword by Wesley C. Mitchell, New York, 1924, pages 161.

Dr. Wolman addresses himself to ascertaining the movement of union membership. This is a much harder task than might appear, and is rendered extremely difficult by a lack of precision and standardization in the methods of computing such figures which are employed by the several unions. It appears, however, easy by comparison with Mr. Wolman's next task of so arranging the occupational statistics furnished by the Census as to make them comparable with the union membership figures. Not only were the figures for employers, salaried men and wage earners in many cases inextricably mixed up, but the occupational classifications of the Census are frequently different from the craft groups into which the labor movement is divided. Excluding agriculture, Dr. Wolman concludes that in 1920, 20.8 per cent of all gainfully employed were organized in trade unions, nearly double the ratio for 1910. By major divisions of industry, extraction of minerals led off with 41.0 per cent, transportation followed with 37.3, then building with 25.5 and manufacturing with 23.2 per cent. Trade was practically completely unorganized (1.1 per cent), but clerical occupations (largely railway clerks), public service and professional service showed 8.3, 7.3 and 5.4 per cent respectively.

The last chapter in the book deals with women in trade unions. Dr. Wolman does considerable to weaken the conclusion that women as such are unorganizable, demonstrating that women are only one-fifteenth as well organized as men because "women work largely in occupations such as trade and domestic service, in which men are also poorly organized, and that they do not work in industries like building and mining, in which the extent of trade union organization is very great, indeed." "In general," he continues, "it appears to be true that in industries where both men and women work, an onrush of labor organization brings both men and women into the union, but, unless membership is protected by some such device as the closed shop the male members become relatively more numerous than the female."

To the student of industrial relations, particularly to the industrial engineer, Mr. Wolman's excellent statistical and analytical work is an indispensable starting point for thought. American unionism studied over a period of four years shows a high degree of stabilization mainly in the skilled mechanical trades, especially building, printing and the upper strata of the transportation group. Unionism is also strong and relatively stable in mining and clothing, in which, although skill plays a lesser part, production may hardly be said to be organized under a modern factory method. It is in the metal and textile industries, in which the American industrial genius has expressed itself the clearest, that unionism finds it the hardest to obtain a permanent foothold. That cannot be explained by any one cause, although the chiefest one seems to be the undaunted determination of the great majority of the employers to keep unionism out at all costs. In recent years the employers in these industries have reenforced their anti-union policy by putting forth a constructive alternative to unionism in a program of "welfare capitalism."

S. Perlman[1]

Economic Statistics. By William Leonard Crum and Alson Currie Patton, A. W. Shaw Co., Chicago, 1925, pages v, 493.

This work, which is the outgrowth of the experience of the authors with a preliminary edition used in courses at Yale, Harvard and other universities, is designed primarily for use as a text book. The more difficult mathematics and technical aspects of the subject, however, have been placed in foot notes and appendices so as to render the body of the text quite readable and understandable to anyone interested in the subject who has something more than reminiscences of his high school mathematics.

Without wasting the reader's time trying to demonstrate the obvious need for statistical processes in economic analyses, the authors attack the subject matter at the beginning of the first chapter and build it up in an orderly and logical manner as the book progresses. They state that the only way to learn to use statistics is personally to work out actual cases. To this end 180 tables and 147 charts providing an opportunity for the reader to obtain an extensive practical knowledge of various types of economic data are spread throughout the text and appendices.

This book is not intended for light vacation reading but should be a valuable contribution to the science of economic statistics, particularly when used as a text book.

E. F. Papworth[2]

Applied Business Finance. By Edmond Earle Lincoln. The A. W. Shaw Co., Chicago, 1925. Pages xx, 772. 3rd edition.

As the author, Edmond Earle Lincoln, states in the preface to the Third Edition of his work, "Applied Business Finance," many changes in statistics and in phraseology have been made in order to bring the book completely up to date wherever the usefulness of the figures depends on their timeliness. New tabular material has been introduced and many passages have been revised throughout. Practically all of Chapter I "Business Finance and the Business Cycle" has been rewritten.

Though this is the third edition it has followed closely on the heels of the first two, and though the book is well known to those who keep in touch with the writing done in the field of finance, some further word about it is appropriate for the benefit of those who are looking for good reading on the subject which it treats.

The author developed the book out of his experience in teaching finance as a professor in the Graduate School of Business Administration at Harvard University. The teaching there is founded on problems prepared on the basis of actual business situations. The author's own book of "Problems in Business Finance" preceded his writing of this book of running text on the subject. Throughout the book shows the writer's closeness to the ground of his subject. His rewriting for the third edition has the benefit of his further experience in practice as chief statistician of the Western Electric Company.

It is, however, of the usefulness of the book to the man engaged in business that the reviewer would especially speak. Though written against a background of teacher and student, its process of derivation has made it especially useful reading for the man of affairs. Business has become so ramifying, complex and specialized in its processes that a man may have had long business experience and still be quite ignorant of many aspects of business. Specifically, the man who has come up in business through the production or sales side, may have acquired great skill and large reputation and remain quite unaware of the nature of the financial problems of business. As such a man approaches executive supervision of the business as a whole, whether through promotion or through engaging in business on his own account, he will, if he is wise, begin to inquire into the problems and practices of finance. For such a man Mr. Lincoln's book has great value. For example, his statement of the relations of the management of an enterprise with its bank contains just the kind of information needed. This is especially so because its treatment of the subject stresses the average concern. Again quoting the preface because it states the fact "The aim of this book is to discuss the problems of business finance, which actually arise from day to day in the average industrial concern, including both manufacturing and trading enterprises. No attempt is made to centre attention on the problems of very large organizations as such, and only incidental mention is made of the financial problems of public utility concerns and holding companies. Little attention is given to the abnormal or spectacular and more public phases of financing."

Hastings Lyon.[3]

NECROLOGY

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